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DISEASES CAUSED BY BACTERIA AND FUNGI.

LEBEAU, A. (1937). Notes cliniques sur les différentes formes des streptococcies en médecine canine, leur diagnostic différentiel avec la maladie de Carré, leur traitement. [**Canine Streptococcal Infections**].—*Rev. Path. comp.* **37.** 1249-1254.

L. contends that the use of vaccine and serum therapy for distemper has greatly facilitated the analysis of the secondary bacterial infections that follow in its wake. He likens such infections to those described as arthritis, anginas and pyaemic infections in man. He also stresses the possibility of the transmission of such infections from owners to their dogs. He claims recoveries in dogs from brown mouth, streptococcal septicaemias and streptococcal skin infections followed by intestinal and brain complications by the use of new antiseptics (sulphamide compounds). The differential diagnoses of these conditions are outlined.

—C. V. WATKINS.

PULLINGER, E. J., & KEMP, Audrey E. (1937). **Growth of *Streptococcus pyogenes* in Milk Stored at Atmospheric Temperatures.**—*J. Hyg., Camb.* **37.** 527-538. 2 tables, 1 diagram. [Numerous refs.]

The significance attaching to the possible contamination of milk with *Str. pyogenes* through human agency during milking was determined by finding whether this organism is able to multiply in the commercial grades of milk. Milk of the different grades was artificially contaminated with cultures of *Str. pyogenes* and the number of organisms was ascertained from plate counts at various intervals. It was found that the organism failed to multiply under conditions of temperature and storage similar to those which normally attain in the handling of milk, and the authors mention the factors responsible for this failure. A review is given of the literature on the pathogenesis of *Str. pyogenes* for the udder of the cow and the relationship of this infection to outbreaks of disease among human beings.

—S. J. EDWARDS.

COTONI, L., & POCHON, J. (1937). Les méthodes générales d'immunisation dans le traitement des infections streptococciques. [**Immunization in the**

Treatment of Streptococcal Infections].—*Rev. Immunol.* **3.** 242-264. [Numerous refs.]

The authors discuss the present position of antistreptococcus immunity with particular regard to the difficulties encountered in its study and its value in practice as a method of treatment. In spite of numerous studies, the problem of immunity to the streptococci is imperfectly understood. In general, the streptococci appear to have only a moderate antigenic power for the experimental animal ; it is difficult to vaccinate the mouse and the vaccination of the rabbit often fails when methods which succeed with other bacteria are used. The efficacy of vaccination can only be shown by demonstrating a resistance to artificial injection of virulent culture. This is made difficult by the fact that really virulent strains of streptococci are uncommon, and exceptional amongst strains freshly isolated from a human source. Whilst immunity to certain strains can be proved beyond doubt, the lack of sufficient choice of virulent strains makes cross-immunity tests and tests of new strains difficult.

Similar difficulties are met with in regard to serotherapy, *e.g.*, in the preparation of sera which will hinder the development of streptococci *in vivo*. Such sera have been prepared by means of strains which produce a septicaemic infection, but the cross-protective powers of these sera are probably limited and not yet sufficiently known. Antitoxic therapy has advanced rapidly, but the part played by antitoxic immunity in streptococcus immunity in general is not yet known precisely enough.

From the practical point of view, bacteriotherapy and preventive vaccination in the treatment of streptococcus infections have hardly been begun, except as regards scarlatina. The authors express agreement with the opinion of WADSWORTH that serotherapy is only " in the precocious stage of its development ". The existence of numerous antigenic races amongst the streptococci presents one of the most serious difficulties to be overcome.

Looking at the future, the authors regard progress in classification of the streptococci as likely to lead to clarification of the aetiology and epidemiology of streptococcus infections. The studies on toxins should result in the production of more powerful antitoxins capable of acting on a greater variety of streptococci. A study of colonial morphology which enabled strains of high antigenic power to be selected would be an important step forward. A precise method of titrating antistreptococcal sera is required and, in view of the difficulties of the *in vivo* method, further study of *in vitro* methods is advocated.—A. W. STABLEFORTH.

I. GWATKIN, R. (1937). **Further Observations on Staphylococcic Infections of the Bovine Udder.**—*Canad. publ. Hlth J.* **28.** 185-191. 2 tables. [8 refs.]

II. THOMPSON, R., & KHARAZO, Devorah. (1937). **Correlated Antigenic and Biochemical Properties of Staphylococci.**—*J. Bact.* **34.** 69-79. 4 tables. [Numerous refs.]

III. FORSSMAN, J. (1937). **Studies in Staphylococci IX. On the Mechanism in Staphylococcal Infection and Immunity.**—*Acta path. microbiol. scand.* **14.** 468-477. [Numerous refs.] [In English].

I. Nineteen cases (7·3%) of staphylococcus mastitis were detected during the examination of 260 cows. Mannitol fermentation appeared to have some practical value in determining the aetiological importance of staphylococci in affected cows, 190 out of 275 strains of *Staph. pyogenes* from bovine udders being positive to the test and 85 negative ; 12·5% positive (mannitol-fermenting) and 60% of the negative strains were recovered from apparently normal udders. Many of the strains showed zone production on Stone's beef extract (gelatin-agar plates)

whilst the filtrates of 7 out of 17 strains produced gastro-intestinal symptoms in kittens. Agglutination and complement-fixation tests on blood sera and whey samples from cases of staphylococcus mastitis were negative. The blood sera of cows with mastitis had clearly a higher staphylococcus antitoxin content than the sera from abattoir heifers and steers. Reference is made to the treatment of three infected cows with staphylococcus toxoid; the results, however, were indefinite.

II. Employing a precipitation technique the authors tested 286 strains of staphylococci isolated from infective sources, from mucous membranes, and from the air, with immune sera prepared against nine of the strains; 93 of the strains (78%) known to be pathogenic for man or animals fell into one antigenic group. [See also *V. B.* **5.** 778]. When tested for orange pigment production, mannitol fermentation, coagulase production and haemotoxin production the majority of strains in this group gave a positive reaction. Fifty per cent of the strains from mucous membranes fell into three antigenic groups; 21% fell into the pathogenic group. Seventy-three per cent. of the strains isolated from the air were in a class by themselves, giving no precipitates with any of the sera. Almost all the non-pathogenic strains were negative to all the biochemical tests.

III. F. maintains that staphylococci produce more than one type of toxin, and that the haemolysin does not play any significant part in the pathogenesis of staphylococcal infections. The dermo-necrotic substance, which is perhaps identical with the lethal substance, is probably the decisive factor in the pathogenesis. These views are at variance with those of RAMON and his co-workers [*V.B.* **7.** 288], who apparently consider that all the toxic substances—haemolytic necrotic, lethal, etc., are identical. F. thinks that RAMON *et al.*, have failed to establish that the antilysin, which is identical with their antitoxin, is of any significance in immunity against staphylococcal infections. His own work on infection experiments with animals has shown that immunity is due chiefly to antibodies of a hitherto unknown type.—N. J. SCORGIE.

I. NETER, E. (1937). **Fibrinolytic, Anticoagulating and Plasma-Clotting Properties of Staphylococci.**—*J. Bact.* **34.** 243-254. 1 table. [Numerous refs.

II. RAKIETEN, M. L., & RAKIETEN, T. L. (1937). **Relationships between Staphylococci and Bacilli Belonging to the Subtilis Group as Shown by Bacteriophage Absorption.**—*Ibid.* 285-300. 5 tables. [Numerous refs.]

III. LYONS, C. (1937). **Antibacterial Immunity to *Staphylococcus pyogenes*.**—*Brit. J. exp. Path.* **18.** 411-422. 7 tables. [9 refs.]

I. Staphylococci may be classified according to whether they produce in plasma a specific fibrinolysin or a non-specific anticoagulant, or whether they possess or lack both properties. Both fibrinolysin and anticoagulant are to be found in staphylococcus infections in man. The former is antigenic, but the latter is not. Staphylococci may also form a plasma-clotting factor which can be demonstrated *in vitro* in dilutions in which the anticoagulant is no longer detectable.

II. This paper lends support to the view that bacteriophages are useful agents in detecting antigenic similarities in organisms not usually regarded as being related. Details are given showing that staphylococcus bacteriophages are absorbed by living or heat-killed cultures of strains of *B. subtilis*.

III. Evidence is presented for an encapsulated invasive phase of staphylococcal growth and for the existence of a type-specific antibacterial antibody to the organism in the capsular phase. The capsule is formed by toxigenic and non-toxigenic strains in young broth cultures, but is absent in older cultures. In the encapsulated phase cocci are resistant to phagocytosis, but growth in serum induces

a non-encapsulated phase susceptible to phagocytosis. In blood the toxigenic strains become encapsulated, but the non-toxigenic strains are killed.

—Gwilym O. Davies.

Fildes, P., Richardson, G. M., Knight, B. C. J. G., & Gladstone, G. P. (1936). **A Nutrient Mixture Suitable for the Growth of *Staphylococcus aureus*.**—*Brit. J. exp. Path.* **17.** 481-484. [8 refs.]

The authors describe media adequate for the aerobic and anaerobic growth of *Staphylococcus aureus* which are as useful as peptone broth with glucose. Both media contain small concentrations of 14 amino-acids (although few of these have yet been shown to be indispensible), ferrous ammonium sulphate in HCl, dithiodiglycollic acid, glucose and a " staphylococcus factor ". In addition the medium for anaerobic growth contains another unknown factor referred to as " Factor 111 ", pyruvic acid and sodium bicarbonate, and growth was obtained in an anaerobic jar containing 5 %CO_2 in an atmosphere of hydrogen. All cultural tests were made with one strain of *Staph. aureus* maintained on agar, the inocula used, by a special technique, averaging about 10,000 cocci.

The authors emphasize the difficulty of distinguishing between aerobic and anaerobic growth when a facultative anaerobe, *e.g.*, *Staph. aureus*, is used. When media suitable for an anaerobe, *e.g.*, *Clostridium sporogenes*, are used, growth will occur provided the oxygen concentration is not too great, the organism using an H acceptor such as glycine or proline. If the same experiment is made with *Staph. aureus* the trace of O_2 acts as H acceptor and produces slight growth, which appears to be anaerobic but is actually aerobic.—C. V. Watkins.

Gofton, A. (1937). **Tuberculosis in Cattle, with Special Reference to Tuberculosis in Calves.**—*Edinb. med. J.* **44.** 333-341.

Records kept by G. show that of 10,000 calves, varying in age from 12 hours to 6 months, 189 (1·89 %) were found on slaughter and inspection to be affected with TB., 147 with TB. of post-natal origin and 42 TB. of definite congenital origin. Lesions confined to the bronchial or mediastinal lymph nodes or both were present in 82 (55 %) of the post-natal cases quoted above, while 60 % of these cases showed lesions confined to the lungs and their associated lymph nodes.

G. suggests that the presence of lesions in the bronchial and mediastinal lymph nodes only, does not necessarily point to inhalation as the mode of infection, especially as calves are removed from their dams soon after birth and calves known to have been fed on milk from a tuberculous udder have been found on slaughter to be affected with TB. of these nodes and not of the mesenteric nodes, as might be expected.

The chief signs of congenital TB. are first, lesions in the liver and its lymph nodes (the primary seat of lesions), then in the substance of the spleen and, later, widespread lesions in the lymph nodes of the carcass. It is suggested that the distribution of lesions seen on P.M. examination of adult cattle (especially where lesions are present in the substance of the spleen) points, in many cases, to an original congenital infection. In some cases where the uterus of the dam of a congenitally-infected calf is examined no TB. lesions are found and this suggests that, as has been found in Denmark, the foetal membranes may be affected without involving the endometrium.

G. thinks that, under the most favourable conditions for the development of infection, not less than 3-4 weeks must elapse between infection of a calf and the appearance of visible lesions of TB.—H. Burrow.

STEWARD, J. S. (1937). **The Routine Examination of Cows for the Detection of Tuberculosis—a Survey of the Published Results.**—*Vet. Rec.* **49.** 1003-1010. 6 tables. [Numerous refs.]

From the annual reports of 19 county veterinary officers, S. has collected the salient features and concludes that the more frequently dairy herds are examined, the greater will be the number of tuberculous animals detected and removed. The number of cows to be examined daily has a definite influence on the clinical efficiency of the veterinary officer: in one district where 60 cows were examined per day 35·6% of cases of udder TB. escaped clinical detection, while in another district where 90 cows were examined per day this percentage was 51·6. S. is of the opinion that one veterinary officer can examine with efficiency a maximum of 12,000-15,000 cows per annum in addition to his work in connexion with the microscopical examination of samples of milk, lung mucus, etc., and general duties under the Diseases of Animal Acts and Orders. The veterinary officer ought to examine personally all individual samples of milk, lung mucus, etc., collected by him, as his personal knowledge of the clinical picture of the animal concerned is an indispensible aid to those microscopical examinations.

A higher percentage of samples of lung mucus than of milk prove positive on examination. Of 7,298 samples of milk examined by six county veterinary staffs, 1,048 (14·4%) proved to be infected, against 969 (34·3%) of 2,824 samples of lung mucus examined by the same workers.

Statistics collected from six counties showed that clinical examination failed to detect 34·6% of cases of udder TB. in herds already known to be the source of infected bulk samples, while in Nottinghamshire 37·6% of such cases in herds not known to be producing infected milk were overlooked on clinical examination. Biological examination of composite (bulk) samples of milk from each herd is a very necessary adjunct to routine clinical examination of the cows themselves. S. pleads for the adoption of a standard method of reporting on herd examinations in order that a mass of valuable information may be collected and analysed.—H. B.

BELGIUM. (1937). Tuberculose bovine.—Instructions aux vétérinaires agréés.—Circulaire du 25 mai 1937.—Abatage de vaches atteintes de mammite tuberculeuse.—Diagnostic de la maladie. [**Belgium. Orders and Instructions on the Control of Bovine Tuberculosis**].—*Bull. Off. internat. Epiz.* **15.** 190-205.

A Belgian royal decree, dated 25th May, 1937, amends that of 19th July, 1927 relating to bovine tuberculosis in order to enforce the slaughter of cows affected with udder TB. Recognizing the difficulty of diagnosis, the decree places the responsibility for notifying the disease not upon the owner or the person in charge of the animal, but upon the attending veterinary surgeon. Slaughter may only be ordered after the diagnosis has been confirmed by a veterinary inspector and by laboratory experiment. The necessary tuberculin may be obtained gratis from the state by approved veterinary surgeons. The state may grant an indemnity, which may be as high as 75% of the value of the cow, to the owner of the animal thus slaughtered.

Amendments are announced in the regulations governing subsidies granted by the state to federations of farmers co-operating in the campaign against bovine TB. The text of the royal decree is given, together with a report of the Minister of Agriculture on the necessity for taking action, ministerial orders relating to fees payable to approved veterinary surgeons and to subsidies, and circulars of instructions to veterinary inspectors and approved veterinary surgeons.—H. V. H.

Mello, A. (1936). Tuberculose e tuberculina. [**Tuberculosis and Tuberculin**]. —*Rev. Industr. anim.* **3.** 141-158. 10 figs. on 6 plates.

TB. is controlled in São Paulo by the tuberculin test, isolation of the reactors, slaughter of clinically affected cattle and BCG vaccination of the calves. In 1933 the cattle in the Palmeira farm herd were divided into two herds based on the results of tuberculin tests, reactors and non-reactors respectively, and the tests were then done periodically.

Ten bovines of the TB. herd were slaughtered and lesions of various extent were found. Of the remaining 24, three no longer reacted to the tuberculin test carried out in December, 1934. One of them was killed and only a small calcified nodule in a mediastinal lymph node was found; inoculation into a g. pig gave a negative result. In 1935, ten others of the TB. herd no longer reacted, and by June, 1936, only eight of the 23 yet alive continued to react.

Occasionally intradermo-vaccination against anthrax causes a reaction at a subsequent intradermal tuberculin test.—S. Torres.

Jeaume. (1937). Tuberculose et tuberculines. [**Tuberculosis and Tuberculins**]. —*Maroc méd.* **17.** 220-225.

J. mentions first the danger to children from consumption of tubercle-infected milk. He regards pasteurization as a means of preventing the souring of milk rather than as a reliable means of sterilization in the case of tubercle-infected supplies. Pasteurization, even though it may destroy tubercle bacilli in milk, does not necessarily remove injurious toxins which J. speaks of as accompanying such bacilli. TB. is rare in cattle and pigs in Morocco and could easily be eradicated.

J. stresses the suitability of the thermic reaction, using Finzi's exotuberculin, for use under conditions in Morocco. He claims that this test eliminates false reactions due either to hypersensitiveness of certain animals to intradermal injections or to the human element in assessing the character of a reaction.—H. Burrow.

Harshfield, G. S., Roderick, L. M., & Hawn, M. C. (1937). **Avian Tuberculosis.**—*J. Amer. vet. med. Ass.* **91.** 323-329. 2 tables. [13 refs.]

This article records data on the study of the epidemiology of avian TB. [See also *V. B.* **6.** 202].

In the first experiment the possibility of the transmission of avian TB. through the egg to the chick was studied. 1,518 chicks were hatched from two flocks of hens which had reacted to the tuberculin test in the field. Of these chicks, 1,411 were examined either by tuberculin tests or by cultural examination and in no instance was TB. found. The egg production of the tuberculous hens, and the hatchability of the eggs were as high as that of normal healthy hens, and in general, the chicks were as vigorous as those from healthy fowls. The authors do not consider that egg transmission is a factor in the dissemination of avian TB.

In the second experiment 246 crows were examined for the presence of TB. Eight showed gross lesions of the disease, six of these cases being of the avian type. The lesions were usually limited to a few nodules and were not of the disseminated, generalized character found in the fowl.

Twenty-six cases of TB. in sheep were typed and with one exception all were of the avian type. A table is given showing the extent of the tuberculous processes in these sheep and the various organs involved. The most noticeable character was the extensive calcification found in the advanced cases.—R. F. Gordon.

Babolini, G. (1937). Sur l'infection tuberculeuse des oiseaux avec des bacilles du type bovin—essayée par voie digéstive. [**Artificial Infection of Fowls**

with Bovine Type Tubercle Bacilli].—*Boll. Sez. ital. Soc. int. Microbiol.* **9.** 94-99. [19 refs.] [In French].

The literature concerning previous attempts to infect birds with human and bovine types of tubercle bacilli is reviewed. On the whole the results obtained by many of the investigators are conflicting, especially those dealing with the transformation of mammalian types of the bacilli into avian types by passage through birds.

B. attempted to infect two hens by repeated ingestion of food with which a bovine (Vallée) strain had been mixed. The hens were killed after four and seven months respectively after receiving the first dose and no specific lesions were found *post mortem*.

The elimination of bacilli in the faeces started at the 12th hour and ceased 6-7 days after the administration of each dose. Glycerin agar cultures from the faeces failed to yield growth of the organism while growth on Petragnani's medium occurred nearly always within 12 days ; the pathogenicity of cultures obtained after the second dose was lessened for the rabbit, but the cultural characters remained the same.—C. V. Watkins.

Urbain, A., Bullier, P., & Nouvel, J. (1937). Au sujet de la tuberculose des mammifères sauvages en captivité. [**TB. of Captive Mammals**].—*Bull. Acad. vét. Fr.* **10.** 350-355. 2 tables. [Numerous refs.]

TB. is recorded in an American bison, an oryx, a coati and a tapir. Their reactions to various tests are given. After the death of the tapir three other tapirs were tested and two gave positive reactions. A bovine strain of the organism was recovered from the oryx.—H. H. Holman.

Cochrane, E. (1937). **Tuberculosis in the Tropics. Part I. A Survey of Tuberculosis in the Tropics. Part II. The Control of Tuberculosis in the Tropics.**—*Trop. Dis. Bull.* **34.** 743-772 and 819-836. 1 table. [Num. refs.]

On pp. 771-772 of Part I there is a résumé of observational and research data, from 1917 onwards, on bovine TB. in tropical countries. On p. 820 of Part II the present position is discussed thus :–

" Before considering the human aspect of the problem it is necessary to mention the need for veterinary prophylaxis. In many colonies, particularly in Africa, a strict watch is being maintained on the incidence of tuberculosis in cattle. That this is essential is shown by the comparatively high rate of infection amongst the cattle in British Guiana, the disease has now been allowed to spread to such extent that eradication by slaughtering will be an expensive measure. Consistent and wide scale tuberculin testing, even though it may appear expensive, will pay in the end if it eliminates the few infected beasts before the disease commences to spread. Nor should the thorough testing of imported cattle be omitted, since importation of bulls from the United Kingdom is often carried out in order to improve the local breeds. Even where milk is not an article of diet the persistent propaganda of health departments that milk is the perfect food is introducing the milk drinking habit, and to replace malnutrition by bovine tubercle, will not reflect credit on any propagandist. The time is ripe for more attention to be paid to this question, lest it produces another problem for the tropical hygienist."—J. E.

van der Hoeden, J. (1937). Tuberculose van dierlijken oorsprong bij den mensch. [**Bovine Type Tuberculosis in Man in Holland**].—*Tijdschr. Diergeneesk.* **64.** 1351-1365. 2 tables. [English, French and German summaries].

The author isolated the bovine type bacillus from 8·03% of the cases of TB. in man treated in the Utrecht University Hospital. The majority of these cases took a severe course (mortality 58·8%); 29 of the 34 patients came from country districts. The bovine type bacillus was also isolated from two out of 36 samples of farm butter (prepared from unheated milk) and from one out of 19

samples of buttermilk. It is emphasized that pasteurization of the milk should be enforced by law.—C. BUBBERMAN (SCHIEDAM).

ANDERSON, R. J., REEVES, R. E., & STODOLA, F. H. (1937). **The Chemistry of the Lipids of Tubercle Bacilli. LI. Concerning the Firmly Bound Lipids of the Human Tubercle Bacillus.**—*J. biol. Chem.* **121.** 649-668. [18 refs.] [See also *V. B.* **7.** 56].

Extraction of lipids from acid-fast bacteria by neutral solvents leaves a certain amount of lipid undissolved, but treatment with acid or alkali renders this fraction soluble in neutral solvents. The bound lipids of the human tubercle bacillus extracted by treatment with acidified alcohol-ether varied greatly in composition, the variation depending apparently on the laboratory process employed. Large quantities of polysaccharide were always present and it is suggested that the lipids were present in the cellular structure in combination with carbohydrate.—A. R.

I. DAVIES, R. (1937). **The Influence of Haemoglobin and Ferrous Ammonium Sulphate on the Growth of the Tubercle Bacillus.**—*J. Path. Bact.* **45.** 773-777. 1 table. [8 refs.]

II. VAN DEINSE, F. (1937). Sur l'emploi du milieu au jaune d'oeuf de Besredka comme milieu de conservation pour le bacille tuberculeux. [**The Use of Besredka's Egg Medium for Conserving Cultures of Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **59.** 467-476. [Numerous refs.]

I. The addition of either ferrous ammonium sulphate or haemoglobin to an egg medium produced an inhibitory action on the growth of a human strain of tubercle bacillus. By counting the number of colonies developing on media containing these two substances and on a control medium it was found that haemoglobin in a concentration of 2·4% caused an inhibition of 65% and the iron salt in a concentration of 0·011% depressed the growth by 70%. D. states that the concentration of iron (0·006%) in his control medium is optimal for the growth of tubercle bacilli.

II. The author describes the preparation of a modified Besredka medium in which tubercle bacilli do not lose virulence on storage. To 200 c.c. of distilled water two egg-yolks are added and, after mixing, caustic soda is added to a concentration of 1%, when clarification of the medium takes place. The total volume is then made up to 600 c.c. and the pH adjusted to 8·0. The virulence of human tubercle bacilli was not reduced after four months or of bovine strains after 12 months' storage at 38°C. Comparative tests in a glycerin broth medium showed that it was inferior to the egg-yolk medium for preserving the virulence of the tubercle bacillus. The author suggests that this favourable effect depends on the fact that the optimum oxidation-reduction potential is obtained in this medium.
—S. J. EDWARDS.

BERTRAND, I., BABLET, J., & BLOCH, F. (1937). Sur l'inoculation intracérébrale expérimentale envisagée comme moyen d'identification des différents types de bacilles de Koch. [**Intracerebral Inoculation as a Means of Differentiating Types of Tubercle Bacilli**].—*Ann. Inst. Pasteur.* **59.** 231-258. 9 figs. [1 ref.]

The different types of tubercle bacilli were inoculated (intracereb.) into rabbits, and a study was made of the characters of the resulting lesions. It was found that this method proved to be a suitable means of differentiating the types, on account of the rapidity and the precision of the results. Strains which, in doses of 0·05 mg., did not produce cachexia or paralysis one month after inoculation

could be classified as human and those which were fatal within this time were bovine or avian. The diffuse nature of the lesions produced by the avian type served to distinguish them from the bovine, which caused large, nodular, caseating lesions of the meninges and of the cerebral parenchyma. A BCG strain inoculated by this route produced only a localized phagocytic reaction and superinfection with a virulent bovine strain was rapidly fatal, but did not affect the slight changes which had been caused by BCG.—S. J. Edwards.

Jungherr, E. (1937). **Ovine Encephalomyelitis Associated with Listerella Infection.**—*J. Amer. vet. med. Ass.* **91.** 73-87. 8 figs. [15 refs.]

Five cases of meningo-encephalitis characterized by monocytic infiltration occurred in a flock of 200 sheep. An organism was isolated from the lesions and shown to be a *Listerella* by cultural and serological tests. Intranasal injections into mice of cultures or of brain suspension from natural cases caused similar symptoms to develop. Cultures failed to give typical symptoms in sheep, but if infected intranasally or *via* the conjunctiva the animals showed a thermal and serological response. Intra-carotid injection caused sheep to die of haemorrhagic meningitis within 48 hours.—P. S. Watts.

Paterson, J. S. (1937). **Listerella Infection in Fowls. Preliminary Note on its Occurrence in East Anglia.**—*Vet. Rec.* **49.** 1533-1534. [9 refs.]

In four outbreaks of disease two adult fowls and 319 younger birds died. Twenty-five were examined and all yielded *Listerella* from the liver, but the significance of this appears questionable, as *Salmonella pullorum* infection, fowl paralysis and heavy tapeworm infestation were also noted. The P.M. appearances are given together with a detailed account of the cultural characteristics of the isolated organisms.—P. S. Watts.

DeVolt, H. M., & Davis, C. R. (1936). **Studies of Incubation Factors in the Agglutination Test for Pullorum Disease.**—*Bull. Md agric. Exp. Sta.* No. 402. pp. 165-176. 4 tables.

When racks containing agglutination tests were placed in the incubator near the heating elements convection currents in the test tube tended to inhibit agglutination, and the higher the temperature of the incubator the greater the inhibition. Increase in temperatur ehastened the reaction, but tended to give a percentage of cloudy reactions. 45°-55°C. was the optimum temperature. When the incubation period was lengthened differences in titre wefe noted, but after 24 hours these differences did not alter the interpretation of the test.—J. E. Wilson.

Jansen, J. (1936). Eendersalmonellose en hare beteekenis voor den mensch. [**Salmonella Infection in Ducks and its Importance**].—*Antonie van Leeuwenhoek ned. Tijdschr. Hyg. Microbiol.* **3.** 184-237. [Numerous refs.]

Salmonella typhi-murium (formula IV, V, XIII : i : 1, 2, 3) which slowly ferments dulcitol, and *S. enteritidis* var. *essen* (formula IX, XIII : g, o, m) which does not ferment rhamnose are the principal causes of salmonella infection in ducks in Holland and are both pathogenic for man (food poisoning through consumption of infected raw or insufficiently cooked duck eggs, duck-egg products or duck flesh). The somatic antigen XIII was discovered by J. and must be the same as Kauffmann's wrongly numbered factor XII. A *pullorum* formol-antigen proved very suitable for the agglutination test for these infections, as it gave a clear flocculation and there was no disturbance of the reaction by erythrocytes.

The disease runs a chronic course in the adult duck with symptoms of oophoritis

(orchitis in the male). Infected eggs are laid, and these produce diseased ducklings which generally soon die from an acute septicaemia. The surviving ones become disease-carriers and produce infected eggs in their turn. During formation the egg is mostly infected from the diseased ovary or oviduct, and can also be externally infected by the faeces or by contact with an infected nest or incubator. Hens' eggs may also be of importance on infected farms, as J. observed an outbreak of *S.e.* among chicks.

The elimination of infection from an infected farm depends upon the taking of strict hygienic measures and isolation of suspected and diseased birds as detected by the rapid serum agglutination test once a year. A mild positive reaction should always be taken as a definite indication of infection.—C. BUBBERMAN (SCHIEDAM).

I. PACHECO, G., & RODRIGUES, C. (1936). O grupo *pullorum-gallinarum* em provas bacteriologicas comparativas. [**Comparison between the *pullorum* and *gallinarum* Group**].—*Mem. Inst. Osw. Cruz.* **31.** 591-653. 6 figs. on 6 plates, 30 tables, 2 graphs. [Numerous refs.] [English summary].

II. NOBREGA, P. (1936). Amostras atypicas de " Salmonella pullorum ". [**Atypical forms of *S. pullorum***].—*Arch. Inst. biol. Def. agric. anim., S. Paulo.* **7.** 61-64. 1 table. [5 refs.] [French summary].

I. The authors studied for three years the cultural characters of 38 strains of the *pullorum-gallinarum* group obtained from different countries. They distinguish five types :– a gas-producing *pullorum*, a non-gas-producing *pullorum*, an intermediate, a gas-producing *gallinarum* (one doubtful strain), and a non-gas-producing *gallinarum* type. Details are given in the tables. During the period of study the strains remained fixed in character. None of the 38 strains could be differentiated by cross-agglutination tests. [See also *V. B.* **6.** 212 and 697].

II. N. says that differences based on carbohydrate fermentation reactions are not important ; the sensitivity to specific bacteriophage and lack of acid production from dextrotartrate are more constant. He considers the " intermediate type " of the above authors to be a typical *S. pullorum*.—S. TORRES.

I. MCEWEN, A. D. (1937). **Experiments on Contagious Abortion. I. The Infectivity of Br. abortus Strain 45 for Cattle. II. Field Immunisation Experiments with a Vaccine Prepared from Strain 45.**—*Vet. Rec.* **49.** 1585-1596. 9 tables. [10 refs.]

II. TOMPKINS, L. J. (1937). **Progress Report with Calfhood Vaccination.**—*N. Amer. Vet.* **18.** No. 11. 29-45. 13 tables.

I. The infectivity of a *Br.a.* strain (Strain 45), previously shown to be of low degree in this respect for g. pigs, was tested on non-infected pregnant cattle. The subcutaneous inoculation of 13 first-calf heifers and two cows failed to produce uterine infection or abortion. The quarter milk samples of a further ten pregnant heifers similarly infected and calving at full time were examined culturally for the presence of organisms of the vaccine strain, but in no case were they detected.

The immunizing value of this strain was tested in eight herds in which contagious abortion was active when vaccination was started and no attempt was made, by any hygienic precautions, to prevent the spread of infection. Both pregnant and non-pregnant cows which were negative to the agglutination test received three inoculations of vaccine and a number of controls were kept in each herd. A complete record was kept for three years of the breeding history and of the agglutination titres of the animals in the experiment and of the naturally infected animals in the herd ; in addition, cultural examination was made of aborted foetuses for the presence of CO_2-sensitive strains of *Br.a.* The results showed

that of 203 vaccinated animals 5·9 per cent. became infected with *Br.a.* during the first year after vaccination, but only 1·6 per cent. of 160 during the second year, while of the animals observed during the third year none became infected. In only two of the herds was it possible to observe both vaccinated and control animals during the whole period, but, in these, fewer abortions due to brucellosis occurred among the vaccinated animals. M. draws attention to some of the difficulties in carrying out field trials of this kind and emphasizes the desirability of conducting them on a large scale, since in his experience the abortion rate due to brucellosis does not usually exceed 10·7% of the total pregnancies in herds.

II. T. presents the results to date (1937) of a field experiment started in 1934 in which groups of calves totalling 357 on three farms were vaccinated at the age of 5-7 months with a strain of *Br.a.* of low virulence. The animals were bled at monthly intervals and it was observed that the agglutination titres after reaching a maximum on the 140th to the 150th day following vaccination reached a titre of 1 : 25 or lower at the end of the first pregnancy. In parallel control groups which had not been vaccinated evidence of natural infection was obtained in 23% of animals on one farm and in 26% on another. At calving the milk of all the vaccinated animals was examined for the presence of *Br.a.* but without success.

—S. J. Edwards.

Sjollema, P. (1937). Brucella-Bang-infectie bij stieren. [*Brucella abortus* **Infection in Bulls**].—*Tijdschr. Diergeneesk.* **64.** 682-688. [13 refs.]

Bovine brucellosis in the bull is clinically characterized by inflammatory swelling of the testicle and adjacent tissues ; in acute cases there is also fever and disturbed general condition, but in the majority of cases there is only a positive agglutination titre. In these cases it is important to find if they discharge bacilli with the ejaculated sperm.

S. believes that the bull in most cases contracts infection *per os* (from milk) or through the skin.—C. Bubberman (Schiedam).

Cordier, G., & Menager, J. (1937). Effets comparatifs des injections sous-cutanées d'un lait de vache renfermant " Brucella Abortus Bang ", sur diverses espèces animales. [**Effect on Animals of Different Species of Subcutaneous Injections of Cows' Milk Containing** *Br.a.*].—*Rev. Méd. vét., Toulouse.* **89.** 580-588. 6 tables. [1 ref.]

As a result of experiments with different species of animals, the g. pig was shown to be the most suitable animal for the detection and isolation of *Br.a.* from cows' milk. With the rabbit, fowl, ass, sheep or goat, agglutinins had not the same regularity in time of appearance or in persistence as in the g. pig. In no case was *Br.a.* isolated from reacting fowls and rabbits slaughtered approximately two months after injection of infected milk.—N. J. Scorgie.

Campbell, W., & Greenfield, E. C. (1937). **The Incidence of Brucellosis in Cases of Pyrexia of Uncertain Origin in the Cape Province of the Union of South Africa.**—*S. Afr. med. J.* **11.** 192-201. 12 tables. [9 refs.]

Cases of human brucellosis in the Cape Province have been found to be due to *Brucella melitensis*, the bovine type of *Br. abortus* and strains intermediate between these types. Out of 661 patients with pyrexia of unknown origin, 4·84% gave reactions in a titre of 1 : 400 or more with one or other of three brucella strains of consistently thermostable suspensibility. 9·37% gave reactions of 1 : 100 and over with the same suspensions. It is concluded that all these cases were at one time or another brucella infections.—E. M. Robinson.

Leskova, R. (1937). Positive Bacillus-Abortus-Bang-Agglutinationen bei Pferden in Wien. [**Positive *Brucella abortus* Agglutination Reactions in Horses in Vienna**].—*Wien. tierärztl. Mschr.* **24.** 225-233. 8 tables. [Num. refs.]

L. found the rapid whole-blood method unsatisfactory with horse-blood, owing to rapid clotting and non-specific agglutination. On the other hand, the rapid serum method made on slides with two parts of serum and one of a stained suspension proved useful, a positive result usually corresponding with a titre of 1 : 50 or higher by the ordinary test-tube method. Of 1,100 horses, from Austria or received from neighbouring States for slaughter, 407 were positive : 120 of these had a titre of 1 : 100 or over by the test-tube method. Of 185 horses with various surgical conditions, 107 were positive, 44 having a titre of 1 : 100 or higher by the tube method. The percentage of positives increased with age, and mares showed 38% positive compared with 35% of geldings. Town horses were less often positive than those from the country, and Austrian horses less often than those imported. No cultures were made, but the authors regard agglutination at 1 : 100 as indicative of infection. [The suspension and method used were those generally used in the Vienna College and with which, in the case of a cow, a reaction at 1 : 100 is regarded as positive].—A. W. Stableforth.

Schmidt, W. (1937). Untersuchungen über den Abortus Bang beim Schaf. [*Brucella abortus* **Infection in Sheep**].—*Tierärztl. Rdsch.* **43.** 643-646. [3 refs.]

The author states that *Br. a.* infection in sheep is not of great economic importance, but that these animals can be experimentally infected. Administration of culture (subcut., intraven. or *per os*) to five pregnant ewes caused abortion, and the organism was recovered from the foetuses. Out of two ewes infected *per vaginam* only one aborted. A ram injected (subcut.) reacted with a rise of temperature, and agglutinins appeared in the blood, but when the animal was slaughtered six months later no organisms were found. As judged by the agglutination reaction, ewes rapidly recover from artificial infection.—P. S. Watts.

Lisbonne, M., & Monnier, P. (1936). Quelques propriétés de l'antigène complet (Boivin) de *Brucella melitensis*. [**Some Properties of the "Complete Antigen" (Boivin) of *Br.m.***].—*C. R. Soc. Biol. Paris.* **123.** 1114-1116. [3 refs.]

The authors have obtained a " complete antigen " from *Br.m.* by the complicated method of Boivin and Mesrobeanu [*V. B.* **6.** 441]. This antigen was almost completely precipitated by antisera (agglutinating) for *Br.m.* if the serum titre was 1 : 1,220. If the titre was below 1 : 600 a homogeneous opalescence measurable by a photometer was produced.

A dose of 2 c.c. of the antigen injected (intraperit.) into g. pigs caused a weight loss of 50-60 g., but further doses were tolerated better. An injection (intraderm.) of 0·1 c.c. into infected g. pigs caused a reaction in 24 hours which increased up to 72 hours and then receded. The reaction was more fibrous and circumscribed than that produced by protein antigens. Usually a dark-coloured scab formed which dropped off about the fifth day. In healthy g. pigs a slightly red and oedematous reaction was produced and this had dispersed by the third day.

The authors give a chemical analysis of the antigen and show that it differs markedly from various brucella extracts used by other workers. Although its specificity as an antigen is very good, the difficulty of its preparation limits at present its use as a diagnostic agent.—C. V. Watkins.

Lesbouyries, & Berthelon. (1937). Entéro-toxémie des ruminants. [**Enterotoxaemia in Ruminants**].—*Bull. Acad. vét. Fr.* **10.** 315-317.

Cases of enterotoxaemia in cattle and goats are described. No toxin determinations were made on intestinal contents, but *Clostridium welchii* Type A was recovered from the bone-marrow.—P. S. Watts.

Debonera, G. (1937). La lutte par le sérum contre la dysenterie des agneaux et des chevreaux. [**Serum Therapy of Lamb Dysentery**].—*Rec. Méd. vét.* **113.** 405-407. [2 refs.]

For practical reasons in the field, serum treatment of lambs of affected flocks is preferred to vaccination of the ewes. The serum is prepared by injecting horses with anacultures of *Clostridium welchii* Types B and C, and the results are said to be good. A few losses still occur from diarrhoea due to *Bacterium coli*. [The reason for including Type C in the preparation of antiserum is not clear. It is referred to as the causal organism of enterotoxaemia, which may indicate that Type D is meant, but it is also credited with a rapidly lethal toxin, a property of Type C]. —P. S. Watts.

Martin, L. A. (1934). Sur un procédé simple de culture de Clostridium Chauvaei. [**A Simple Culture Method for** *Cl. chauvoei*].—*Arch. Inst. Pasteur Maroc.* **1.** 369-372. [4 refs.]

M. gives the method of preparation of a medium consisting of equal parts of liver broth and Martin's peptone broth, to which he adds 2·5% of fresh potato flour. He claims that this forms a good medium for the growth of *Cl. chauvoei*. —P. S. Watts.

Henriksen, S. D. (1937). **Dissociation of Clostridium welchii.**—*Acta path. microbiol. scand.* **14.** 570-596. 21 figs. on 2 plates, 7 tables. [18 refs.] [In English].

Twenty-two strains of *Cl.w.* (apparently Type A) were studied morphologically and serologically. The agglutination and complement-fixation tests were found to be strain-specific. Two types of dissociation were noted :- (1) a spontaneous morphological change in which the bacterial elements were filamentous, but still possessed all the toxigenic, serological and biochemical properties of the normal type ; (2) a dissociation into " R " forms by growth in 10% immune serum in which there was loss of capsular substance, with slight serological changes. —P. S. Watts.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Courtade, R. (1937). Étude de la dourine. [**Study of Dourine**].—*Thesis, Lyons.* pp. 95. 3 figs. [Numerous refs.]

Methods of diagnosis and means of treatment are the aspects of the subject more fully dealt with in the thesis. Veterinary police measures in force in France, Algeria, Tunis and Morocco are described in detail. Clinical diagnosis cannot be made with certainty, especially in the case of donkeys, in which the disease often takes an atypical form. More reliance therefore must be placed upon laboratory methods of which the best is considered to be the complement-fixation test as elaborated by Watson, using Zottner's stable alcoholic antigen.

To obtain a definite cure in a minimum of time, novarsenobenzol in doses as used by Ciuca (two intravenous injections of 4-4·5 g. per 100 kg. body weight at intervals of 24 hours) is advocated [see also *V. B.* **4.** 568]. With reference to

the French preventive regulations, C. suggests many modifications which early diagnosis and effective treatment would allow.—G. Williamson.

van den Branden, F. (1937). Essais d'utilisation de la réaction au formol-neostibosane et de la réaction au sulfarsénol dans le diagnostic des trypanosomiases animales. (Deuxième note). [**The Formol Neostibosan and Sulfarsenol Reactions in the Diagnosis of Animal Trypanosomiasis**].—*Ann. Soc. belge Méd. trop.* **17.** 245-246. [1 ref.]

Nattan-Larrier and Grimard-Richard have used neostibosan and formalin to obtain a flocculation reaction in tests for leishmania [*V. B.* **4.** 723.] and Caminopetros has described a test for the same disease by means of the addition to serum of sulfarsenol [*V. B.* **4.** 759].

The present experiments were carried out on rabbits, g. pigs, and white rats inoculated with *Trypanosoma brucei*. In the case of formol neostibosan only one positive reaction occurred in 31 infected white rats, two positives in nine g. pigs, and no positive reactions in infected rabbits. Tests with sulfarsenol gave no positive reactions in any of the infected animals.—S. J. Gilbert.

Guibert. (1937). Expériences de transmission de *Trypanosoma gambiense* de cobaye contaminé à cobaye sain par l'intermédiaire de *Stegomyia fasciata*. [**The Transmission of** *T. gambiense* **from Infected to Healthy Guineapigs by Means of** *Stegomyia fasciata*].—*Ann. Méd. Pharm. colon.* **35.** 136-143. 4 plates. [Copied *verbatim* from *Trop. Dis. Bull.* **34.** 927. Signed W. Y.]

Experiments showed that *Stegomyia fasciata* (*Aëdes aegypti*) was capable of conveying mechanically *T. gambiense* from infected to healthy guineapigs up to an hour after feeding on the infected animal.

Kroó, H. (1936). Die spontane, apathogene Trypanosomeninfektion der Kaninchen. [**Spontaneous Non-Pathogenic Trypanosomiasis in Rabbits**].—*Z. ImmunForsch.* **88.** 117-128.

The paper, which deals with trypanosomiasis in a stock of laboratory rabbits in Spain, is divided into four main parts which describe the structure of the trypanosome, the course of infection, immunity and serological observations, and chemotherapy. The body of the parasite is described as slender, and ends in an obvious, beak-like prolongation. The nucleus is oval and compact. The length of the organism is between 28μ and 29μ. Of the animals examined, the highest positives, numbering 43%, were found to occur in June, July and August. Substances like the mono-salts of sodium, when injected, were found to cause the disappearance of the trypanosomes within 24 hours.—C. Horton-Smith.

I. French, M. H. (1937). **Changes in the Sedimentation Rates of the Red Blood Corpuscles during Trypanosome Infections.**—*J. comp. Path.* **50.** 191-194. 2 tables. [4 refs.]

II. Packchanian, A. (1937). **The Electrical Conductivity of Blood and Serum in Acute Trypanosoma brucei Infection.**—*Ibid.* 195-200. 1 fig., 2 tables. [16 refs.]

I. F. tested the sedimentation rate of the red blood corpuscles in sheep and cattle infected with *Tryp. congolense* and in sheep and donkeys infected with *Tryp. brucei*, comparing the results with the rate in healthy control animals. He found that sedimentation was much more rapid in donkeys than in cattle and sheep, that the rate in donkeys infected with *Tryp. brucei* was greater than that in a healthy control, and that the sedimentation rate increased progressively with the duration

of infection. In sheep infected with either *Tryp. congolense* or *Tryp. brucei* the rate was slightly increased, whilst in cattle infected with *Tryp. congolense* the rate increased during the first 24 weeks, but then returned to normal. Various explanations of variation in the rate of sedimentation are discussed.

II. P. compared the electrical conductivity of the sera and blood of rats infected with *Tryp. brucei* and that of normal rats, and also made a limited number of observations on the conductivity of the sera of rabbits, fowls and horses. For the determination of the conductivity, the Kohlrausch high frequency current bridge method was used. Although individual sera varied in their conductivity, no specific variation could be detected between the sera of the various species of animals, nor between that of the healthy and infected rats. The conductivity of defibrinated blood was less than that of serum, and that of normal rat blood less than that of rats infected with *Tryp. brucei*.—U. F. Richardson.

I. Duke, H. L. (1936). **Some Recent Advances in the Biology of Trypanosomes of Sleeping-Sickness.**—*Rep. Epidemiol. L.o.N.* **15.** 187-200. [Numerous refs.] [French summary].

II. Corson, J. F. (1937). **The Use of Isolated Infective Flies in Transmission Experiments with** *Glossina morsitans* **and** *Trypanosoma rhodesiense*.—*J. trop. Med.* (*Hyg.*). **40.** 248-249. [4 refs.]

I. D. reviews recent work on human trypanosomiasis, discussing arsenic resistance, the factors influencing the capability of trypanosomes to develop in tsetse fly, human resistance to infection with *Tryp. brucei*, the behaviour of human trypanosomes in animals and the origin of trypanosome strains infective to man. He concludes that man should be protected from the attacks of tsetse fly and that since economic development has been responsible for the spread of sleeping-sickness, civilization is morally responsible for the protection of endangered populations. Sleeping-sickness is a disease associated with poverty and the low standard of living such as occurs in " fly " areas, and isolated human settlements in such areas supply the conditions which favour an infection with *Tryp. rhodesiense*. If human settlement has to be undertaken in game-tsetse areas the game should be exterminated, though it does little harm except to attract tsetse fly. Much can be done to avoid human infection by concentration of population and by raising the standard of living. Game preserves should be defined, and measures should be taken to supervise visitors, both white and black, to such reserves. The value of Bayer 205 as a preventive should be borne in mind.

II. C. discusses the advantages and disadvantages of using individually isolated tsetse flies in experimental work on the transmission of trypanosomiasis. He points out that only about 10% of such flies become infective, but that infective flies can be certainly identified by their ability to infect laboratory animals. Two flies, however, fed on the same animal may take up different strains of trypanosomes. When boxes of flies are used for transmission experiments, and the number infected is determined by subsequent dissection, it is difficult to make certain that the infected flies fed on any given animal, as some flies refuse to feed for as long as a fortnight.—U. F. Richardson.

Robinson, E. M. (1937). **Trichomonas Infection in a Heifer and a Brief Review of Abortion in Bovines due to Trichomonas Infection.**—*J. S. Afr. vet. med. Ass.* **8.** 134-140. 2 figs. [4 refs.]

This paper contains the first record of the diagnosis of trichomonas infection as a cause of abortion in cattle in South Africa. Well stained preparations were obtained with Giemsa's stain preceded by fixation with May-Grünwald. The

value of moist preparations for the diagnosis of the condition is emphasized. The greater portion of the paper is devoted to a review of the literature on the subject.

I. DE BLIECK, L., & BOS, A. (1936). Verder onderzoek over de verspreiding van de trichomonadenziekte bij het rund in Nederland. [**Trichomonad Infection of Cattle in Holland**].—*Tijdschr. Diergeneesk.* **63.** 964-968. [6 refs.] [English, French and German summaries].

II. TOMAN, R. V. (1937). Trichomonasinfectie als oorzaak van onvruchtbaarheid bij het rund. [**Sterility Caused by Trichomonads in Cattle**].—*Tijdschr. Diergeneesk.* **64.** 1038-1041. [German summary].

I. In 12 out of 28 cases of pyometra in cattle *Trichomonas foetus* was isolated 11 times in pure culture. The disease attacks cows and bulls and can do considerable damage by causing sterility.

II. As the microscopic demonstration of trichomonads in uterine exudate often fails, the diagnosis may depend upon the infectious character of the disease and the exclusion of other possible causes. Infection is contracted at coitus as well as through external contact. Treatment consists of repeated infusion of Lugol's solution, injections of yatren-casein, and rest.—C. BUBBERMAN (SCHIEDAM).

I. REES, C. W. (1937). **Observations on Venereal Trichomoniasis in Bovines.** —*J. Parasit.* **23.** 554-555.

II. REES, C. W. (1937). **Obtaining Bacteria-Free Pure Lines of** *Trichomonas foetus* **by Means of Microisolation.**—*Amer. J. Hyg.* **26.** 283-291. 1 fig., 1 table. [10 refs.]

I. This is an abstract of a paper given at a meeting of the American Society of Parasitologists. Of four heifers inoculated intravaginally in August, 1936, one failed to show oestrum and was killed and the remaining three showed irregular oestrum and had not calved in October 1937. Two control heifers behaved normally. Three other heifers served by an infected bull became infected after an average period of 12 days.

II. Using a micromanipulation apparatus and methods which are described in detail, R. succeeded in isolating a single bacteria-free trichomonad in 45 out of 75 trials. He states that in contrast with the equipment now on the market for carrying out micro-isolation, the apparatus he has constructed is not complicated and is inexpensive.—W. J. IRONSIDE.

I. PINGGERA, H. (1937). Beitrag zur Reinzüchtung der Rindertrichomonaden. [**Pure Cultivation of Cattle Trichomonads**].—*Wien. tierärztl. Mschr.* **24.** 533.

II. SCHWÄGERL, E. (1937). Beitrag zur Züchtung der Uterustrichomonaden des Rindes. [**Cultivation of Uterine Trichomonads from Cattle**].—*Ibid.* 534-535.

III. UHLENHAUT, F. A. (1937). Beitrag zur prophylaktischen Bekämpfung der Trichomonadenseuche. [**Control of Bovine Trichomoniasis**].—*Münch. tierärztl. Wschr.* **88.** 385-394. 5 figs. [Numerous refs.]

IV. WOHLFARTH, C. (1937). Beitrag zum Vorkommen der Trichomonaden im Urogenitalapparat des Rindes. [**Trichomonads in the Uro-Genital System of Cattle**].—*Inaug. Diss., Giessen.* pp. 40. 1 table. [Numerous refs.]

I. By the addition of trypaflavine (1 : 300,000), " natriumazid " (1 : 10,000) and sodium chloride (1 : 5,000) to broth cultures inoculated with pyometra exudate, it is possible to inhibit most of the contaminating bacteria without damage to the trichomonads.

II. S. attempted to prepare an improved culture medium from trichomonads, using an "alkali albuminate", mixture for addition to the broth base instead of blood serum or, he says, pyometra pus. It was, however, not a success as the growth of trichomonads was adversely influenced. A good growth of trichomonads was obtained by the use of broth to which had been added pieces of tissue, the most useful being pieces from the mucous membrane of the uterus or from the udder or testis. The covering of the culture with a layer of liquid paraffin also favoured growth.

III. As the best method of controlling bovine trichomoniasis is the prophylactic treatment of bulls, U. tested the value of various methods. The most effective method of preventing the spread of infection is the employment of artificial insemination; alternatively it is also possible to check the spread by disinfectant treatment of bulls before and after service by means of preputial irrigations with sodium perborate 2%, alum 1%, valvanol 1% or trypaflavine 0·1%.

IV. W. examined the uro-genital tract of the cows at an abattoir. In 25 the uterus was normal and in 33 it showed pathological changes. In none of the former were trichomonads found, but in the latter trichomonads were found in one cow with endometritis, in 15 out of 16 affected with pyometra and in one out of two uteri of pregnant cattle which were diseased.—G. Hartmann (Vienna).

I. Cailleau, Relda. (1937). La nutrition des flagellés tétramitidés, les stérols, facteurs de croissance pour les trichomonades. [**Sterols as Growth Factors for Trichomonads**].—*Ann. Inst. Pasteur.* **59.** 137-172 and 293-328. 4 figs., 11 tables. [Numerous refs.]

II. Cailleau, R. (1937). La culture des flagellés du genre Trichomonas en présence de divers sérums. [**Culture of Trichomonads in Serum**].—*C. R. Soc. Biol. Paris.* **124.** 435-439. 1 table. [6 refs.]

I. C. studied the growth and multiplication *in vitro* of *Eutrichomastix colubrorum*, *Trichomonas foetus* and *Tr. columbae*. The media used were broth plus 5% concentration of serum obtained from nine species of animals. Two strains of *Tr.f.* were examined, one of which grew well in media containing sera from man, cat or g. pig, but poorly or not at all with sera from horse, sheep, rabbit, rat, pigeon or chicken. A second strain of *Tr.f.* showed poor growth with all sera. The poor results with horse serum could be attributed to its agglutinating action on the organisms and to the absence of a necessary growth factor.

In studying the growth requirements of the three organisms, it was found that liver supplied at least two necessary factors—an undetermined thermostable substance insoluble in acetone, ether and alcohol and a second substance identified as cholesterol. The results of a study of 67 different sterols as to their efficacy as growth factors is given.

II. A short résumé of I.—N. J. Scorgie.

Stabler, R. M. (1937). **Further Studies on** *Trichomonas columbae*.—*J. Parasit.* **23.** 554.

The examination of over 100 pigeons, 26 hawks, two owls, and 59 other birds (robins, swallows etc.) showed *Tr.c.* present in 82·4% of the pigeons and in eight of the hawks.—W. J. Ironside.

Hawn, M. C. (1937). **Trichomoniasis of Turkeys.**—*J. infect. Dis.* **61.** 184-197. 3 tables. [13 refs.]

The condition here described is characterized by the presence of caseating necrotic lesions in the mucosa of the oesophagus and crop. The most serious

lesion is the presence of a large necrotic mass in the posterior part of the oesophagus which gives rise to partial or complete occlusion. *Trichomonas diversa* is found present in large numbers in the affected parts.

The condition was transmitted experimentally when unfiltered extract of lesions was used and also by the use of cultures. Moreover it was found that healthy birds contracted the disease when placed in contact with carriers of the parasite.

The morphology of *Tr.d.* is dealt with in considerable detail.—W. J. Ironside.

Nicolau, S., & Pérard, C. (1936). Sur l'origine des troubles cutanés dans la leishmaniose canine généralisée. [**Origin of Cutaneous Lesions in Generalized Canine Leishmaniasis**].—*Bull. Acad. vét. Fr.* **9.** 479-482. 3 figs. [2 refs.]

The subject of this article was the same animal as in a previous experiment [see *V. B.* **6.** 648]. During life there was almost complete anaesthesia of the skin and testicles. Emaciation was extreme although the appetite remained good. There was marked depilation and a noticeable symmetry of the numerous skin ulcers. The previous article described the nerve lesions found in this animal and these led the authors to conclude that the skin lesions accompanying generalized leishmaniasis in the dog are merely secondary results of the parasitism of the peripheral nervous system.—C. V. Watkins.

Petrov, V. R. (1935). K voprosu o rasprostranenii kala-azar v Taškente. [**The Spread of Kala-Azar in Tashkent, U.S.S.R.**].—*Trud. Tadzikst. Basi Akad. Nauk, SSSR.* **5.** 61-74. 1 fig., 1 table. [11 refs.]

P. attributes the spread of kala-azar in Tashkent to sand flies. There are two seasons of these insects in Tashkent, one occurring in May-June, the other, in late July-August. Outbreaks of kala-azar occur in autumn and winter, after periods corresponding to the incubation period of the disease. Dogs are regarded as a source of infection. Three streets in which there were establishments where dogs were treated for leishmaniasis became centres of kala-azar in human beings.

Aiyar, K. R. S. (1937). **The Occurrence of Coccidia in Dogs at Bombay.**—*Indian vet. J.* **14.** 139-143. 2 figs. on 1 plate. [10 refs.]

Six dogs in Bombay were found to harbour *Isospora rivolta*. Symptoms, presumed to be caused by the parasites, in two of the dogs are described.

—G. Williamson.

Yosikawa, M. (1936). **Prevention and Treatment of Avian Coccidiosis.**—*J. Jap. Soc. vet. Sci.* **15.** 245-261 of pt. 1. 10 figs. on 1 plate, 5 tables, 1 chart. [9 refs.] [In Japanese: abst. from German summary pp. 68-69 of pt. 2].

Poultry breeding has become an important industry in Japan in recent years. A result of this has been the increase of disease caused by *Eimeria avium* [the true species is doubtful]. Experiments with an iodine remedy called "Jodinol" were first undertaken in 1933. Treatment of two-month-old birds was carried out in the early morning of every fourth day by adding a 0·125% "Jodinol" solution to the drinking water. The dosage was increased for older birds, *e.g.* for one and two-month-old birds 2 c.c. were added to the water, for three-month-old birds 3 c.c. and so on. It is claimed that the symptoms of the disease diminished and that favourable results were obtained from prophylactic and therapeutic treatment. No secondary reactions were noted, but atrophy, vacuolation and complete break-up of faecal oocysts were observed after about ten days.—C. Horton-Smith.

Taliaferro, W. H., & Mulligan, H. W. (1937). **The Histopathology of Malaria with Special Reference to the Function and Origin of the Macrophages in Defence.**—*Indian med. Res. Mem.* No. 29. pp. 138. 37 figs. on 15 plates, 4 tables. [Numerous refs.] Suppl. to *Indian J. med. Res.*

Part I of this memoir reviews the literature dealing with the cells involved in phagocytosis and other body defences, and their relative importance and origin. The defence system in malaria is discussed in detail, and an account given of the histopathology of the spleen, liver, bone-marrow, suprarenal gland, lung, brain and other organs with a view to assessing their functions in defence and the localization of the response to the parasitic stimulus.

Part II describes the histopathology in monkeys, *Silenus rhesus* (*Macacus rhesus*), infected with *Plasmodium cynomolgi* which produces a benign infection, and *P. knowlesi* which causes an acute disease, running a fatal course without crisis or recovery. Phagocytosis appears first in the spleen, then in the liver, and finally in the bone-marrow, but is always most apparent in the spleen. Although phagocytosis may occur in the blood or other organs it appears to be relatively limited, except that in a splenectomized animal the macrophages of the suprarenal begin to show evidence of activity. There is considerable destruction of cells, which is manifested by a loss of erythrocytes, increased lymphorrhexis in the splenic nodules and a peculiar hyalinization of the reticular cells of the secondary nodules of the splenic follicles. No important pathological changes are found in organs other than the spleen, liver and bone-marrow. Cellular destruction is more pronounced in infections with *P.k.* than in those with *P.c.*, this being evidenced by wide-spread extramedullary erythropoiesis, such a pronounced loss of lymphocytes that few are to be found either in the spleen nodules or in the red pulp, and the commencement of degenerative changes in those macrophages engorged with parasites. In both infections cytogenesis of macrophages in the spleen is associated with marked lymphoid hyperplasia, but in *P.k.* infection all available phagocytic mononuclear cells appear to be mobilized, and cells which, except for a slight increase in cytoplasm, appear to be lymphocytes are sometimes phagocytic. Ultimately, in the terminal stages of *P.k.* infection, lymphoid hyperplasia is arrested and counteracted by the tremendous destruction of cells.

Discussing these observations, the authors point out that immunity in malaria does not appear to be associated with the ability of the host to control the multiplication of the parasite, but on the destruction of the parasites by the macrophages. Since, however, when immunity has been acquired, the individual macrophages are able to phagocytize a larger number of parasites, it seems that some opsonic antibody may also be involved. The defence against malaria is thought to depend largely on the macrophages, and from the beginning of infection large numbers are available, but as the disease progresses a greater number are mobilized, particularly in the spleen. It is suggested that the more important cells which are immediately available for this purpose are:– (1). The outstretched reticular cells in the Billroth cords of the red pulp of the spleen which can function as fixed macrophages, or, after becoming round, may become free macrophages. The reticular cells of the splenic nodules may behave similarly, and the monocytes of the splenic pulp are also available. (2). The lining cells of the sinusoids of the liver, spleen and bone-marrow (littoral cells) may also become phagocytic, particularly those of the liver (Kupffer cells).

The cells which are chiefly responsible for the increase in macrophages are :– (1). A few functional macrophages in the spleen, liver and bone-marrow, which divide by mitosis after engorgement. (2). The outstretched, reticular cells of the spleen, chiefly those of the nodules and to a less extent those of the red pulp, which

divide and become potential macrophages. (3). The non-granular leucocytes (lymphocytes and monocytes, the latter arising from the lymphocytes) which increase in size and develop phagocytic powers.

The authors consider that the third source of new macrophages is the most important, and point out that lymphoid hyperplasia is most marked in the spleen where it is accompanied by the disappearance of small lymphocytes from the nodules and by an increase in the medium and large lymphocytes and in the number of mitoses.

The restriction of the defence reaction against malaria to the macrophages of certain organs is advanced in support of the opinion that most general immunities are actually local immunities in strategically placed organs, and that in malaria the spleen is the main organ concerned, because it contains large numbers of macrophages and the circulation is sufficiently slow to allow them to reach the parasites. —U. F. Richardson.

Nikolsky, S. N. (1937). Zur Frage der Nuttalliose der Pferde. [**Equine Piroplasmosis**].—*Z. InfektKr. Haustiere.* **51.** 87-88. [4 refs.]

N. records that he has confirmed the presence of *Babesia equi* and *B. caballi* in North Caucasus. The former may produce acute or chronic disease, usually in imported horses. Cases are characterized by fever, icterus and petechial haemorrhages on the mucous membranes. [Haemoglobinuria is not mentioned]. The acute disease is most prevalent from the end of April to October, being correlated with the prevalence of *Hyalomma marginatum* which may be the only tick present in large numbers. When chronic disease occurs it does not appear to be associated with the *Hyalomma*, and *Dermacentor silvarum* is usually present and may be the vector in such cases.—U. F. Richardson.

I. Jackson, C., & Dunning, F. J. (1937). **Biliary Fever (Nuttalliosis) of the Cat : a Case in the Stellenbosch District.**—*J. S. Afr. vet. med. Ass.* **8.** 83-88. 1 fig. [9 refs.]

II. McNeil, J. (1937). **Piroplasmosis of the Domestic Cat.**—*Ibid.* 88-90.

I. A case is described of piroplasmosis in the cat, with a febrile reaction, anaemia and jaundice. Recovery took place after treatment with " akiron ". A heavy infestation of the red corpuscles with a piroplasm of the *Nuttallia* type was found. The parasite closely resembled *N. felis* of the Sudanese wild cat (Davis, 1929), but owing to its much greater pathogenicity the authors consider it should be described as *N.f.* var. *domestica.*

II. A disease in cats is described and attributed to a piroplasm infection of the red blood corpuscles. The symptoms are those of fever, anaemia and jaundice and the mortality is much lower than in canine piroplasmosis. Treatment with trypan blue or " akiron " is effective. Transmission of the condition to other cats by blood inoculation failed. M. considers the disease to be conveyed by *Haemaphysalis leachi*, but no tick transmission experiments were carried out.—E. M. R.

Mangrulkar, M. V. (1937). **On a Piroplasm of the Indian Cat** (*Felis domesticus*). —*Indian J. vet. Sci.* **7.** 243-246. 1 plate. [5 refs.]

Blood from a dead cat which was examined for microfilariae was found to contain piroplasms, though not in large numbers. The parasite was small, the average size being 1·5μ. It resembled to some extent the one described by Davis (1929) as *Babesia felis*, occurring in the Sudanese wild cat, but no cruciform types were seen. Reference is made to the few other published descriptions of piroplasmosis in the Felidae, and M. expresses the belief that the piroplasm now

described is different from these, on account of the absence of cross-division. A number of other cats examined were negative.—S. J. Gilbert.

van Saceghem, R. (1937). Les theilérioses. [**Theileriases**].—*Bull. Soc. Path. exot.* **30.** 675-679. [8 refs.]

Infective ticks were obtained from Algeria and placed on five cattle coming from a region in which *Theileria parva* was enzootic and which had certainly been infected. All except one developed mild symptoms of infection; Koch bodies and gametocytes were only found in one of the four which did react. Two controls brought from a district free from theileria, were infected by the ticks and each passed through a definite attack of theileriasis. These experiments are believed to show that some immunity against *Th. dispar* was given by previous infection with *Th.p.* and it is suggested that the Algerian strain might be described as *Th. parva* var. *dispar*.

The author remarks that in the Algerian experiments the passage of *Th.p.* was not made by ticks, but by lymph node juice or blood, which only confers a relative immunity, and points out that different strains of both *Th.p.* and *Th.d.* exist. *Th.p.* appears to be more virulent than *Th.d.* Further, Sergent and his collaborators differentiate these theileria as being carried by different ticks, *Th.p.* by *Rhipicephalus* and *Th.d.* by *Hyalomma*; but it should be noted that these ticks are of fairly closely related genera. The author does not think that the morphology of theileria found in the blood is a useful method of differentiation, and also refers to his previous conclusion (1925) that animals recovered from *Th.p.* remain in a state of latent infection from which ticks can become infected. This is also true in regard to *Th.d.*—S. J. Gilbert.

Sprinholz-Schmidt, A. J. (1937). Eine Theileria des gefleckten Hirsches (*Cervus* [*pseudaxis*] *hortulorum*) im fernen Osten. [**A Theileria of Spotted Deer in the Far East**].—*Z. Parasitenk.* **9.** 470-477. 30 figs., 3 tables. [12 refs.]

A parasite of the red blood corpuscles of spotted deer of Eastern Russia is described as a Theileria on account of its size and pleomorphism, the various forms resembling those of *Th. mutans* of cattle. [No schizont forms, characteristic of the genus *Theileria*, are mentioned]. Five deer examined all showed a blood infection with the parasite, but no disease ascribable to piroplasmosis could be detected in the herd concerned.

Previous descriptions of piroplasmal infections of deer are reviewed, and it is concluded that the parasite is probably identical with *Th. damae* recorded by Bettencourt, França and Borges (1907) in various species of deer in Portugal. —U. F. Richardson.

Coles, J. D. W. A. (1937). **Aegyptianellosis and Leg-Weakness of the Goose.** —*J. S. Afr. vet. med. Ass.* **8.** 98-100. [3 refs.]

Two cases of aegyptianella infection in geese are described and four ducks and 12 mice were inoculated intracerebrally with a strain from one of them. Two of the ducks died suddenly 20 days later, both showing *Ae. pullorum* infection. As a result of experiments with *Argas persicus* on ducks which developed paralysis, but showed no evidence of *Ae.p.* infection, C. concludes that the paralysis and the *Ae.p.* infection in geese were probably two separate conditions transmitted by the parasite.—E. M. Robinson.

Dschunkowsky, E. (1937). Balfoursche Granula als echte Geflügelparasiten, ihre Natur und Stellung in der Systematik: Aegyptianella pullorum

Carpano, Balfouria n. genus, Balfouria anserina n. sp. und Balfouria gallinarum n. sp. [**The Nature of Balfour Granules and the Position of the Parasites in Systematic Classification: a New Genus,** *Balfouria, Balfouria anserina n. sp.* **and** *Balfouria gallinarum n. sp.*]—*Zlb. Bakt. I.* (*Orig.*). **140.** 131-136. [17 refs.]

The nature of Balfour's granules is discussed, and it is considered that they cannot be a stage in spirochaete infection as they may occur in the absence of spirochaetes. They represent a true parasitic infection in birds. They cannot be classified as Babesiidae in view of their multiplication by schizogony, nor can they be placed in the genera *Theileria* or *Rangellia* in which schizogony occurs in lymphocytes or endothelial cells. The generic name *Aegyptianella* is considered unsuitable in view of its local implication, and it is suggested that a new genus, *Balfouria*, should be created with the two species *B. anserina* of the goose and *B. gallinarum* of the fowl. [Under the rules of international nomenclature the generic name *Aegyptianella* should be retained].—U. F. Richardson.

Braga, A. (1937). Caso do borreliose murina (" Sodoku "), com referencia especial a 6 caseos em *Canis Familiaris* no Brasil. [**Sodoku** (*Borrelia muris* **Infection) in Dogs in Brazil**].—*Bol. Soc. brasil. Med. vet.* **7.** 141-152. 5 figs. on 3 plates. [18 refs.] [Also appeared in *Biol. méd.* **4.** 17-35].

This is the first description of sodoku (rat bite fever) in dogs in Brazil. Six cases in fox-terrier dogs are described. The incubation period varied from five to 14 days. The symptoms included fever, a local reaction at the site of the rat bite, jaundice and albuminuria. Neosalvarsan in a dose of 0·07-0·15 g. gave good results in treatment. *B.m.* was demonstrated in the blood of the infected dogs and was transmitted to g. pigs by blood inoculation.—S. Torres.

I. Klarenbeek, A. (1936). Die Leptospirose beim Hund. [**Leptospirosis in the Dog**].—*3rd int. Congr. comp. Path. 1936.* **1.** Pt. 1. Vet. Sect. 27-32. [3 refs.] [French summary].

II. Verge, J. (1936). Les spirochétoses animales. [**Spirochaetosis in Animals**]. —*Ibid.* 33-66.

III. Bourgeois, E. (1936). Remarques sur l'anatomie pathologique de la spirochétose du chien. [**Pathology of Canine Spirochaetosis**].—*Ibid.* **2.** 395-401. [In French].

IV. Huguenin. (1936). Des types d'évolution des spirochétoses (ou leptospiroses) du chien. [**Types of Canine Spirochaetosis**].—*Ibid.* 402-404. [In French].

I. The clinical aspect of canine leptospirosis is discussed. Stuttgart disease is considered to be a non-icteric form of the disease. Transmission of leptospira infection from dog to man has not been recorded.

In Holland there has been isolated from canine and human cases, a type of *L. icterohaemorragiae* which is serologically and immunologically distinct from that usually found.

II. A very useful and detailed review is given of the bacteriology, pathology, diagnosis and treatment of spirochaetosis in animals and birds.

III. The P.M. findings in 46 cases of canine spirochaetosis are recorded. In twenty-one the disease was of the acute type. Of the latter, 10 showed icterus, haemorrhagic gastro-enteritis of a mild type, haemorrhages in the mucous membranes and viscera, enlargement of the spleen, hepatitis and haemorrhagic tubular nephritis. The other 11 of these acute cases were typical of Stuttgart disease. The remaining 25 cases showed chronic lesions of the endocardium,

of the parietal pleura, of the tunica intima, of the aorta and of the pulmonary artery. The affected parts were thickened, wrinkled, parchment-like, and of a greenish grey colour.

Microscopically the lesions of the vascular system were loss of endothelium, hyaline degeneration of the elastic and collagen fibres, oedema and infiltration by leucocytes and lymphocytes. There was interstitial nephritis.

IV. The author discusses the various clinical forms of canine spirochaetosis:– (1) the acute form non-icteric (Stuttgart disease) or icteric, (2) the subacute form in which there is interstitial nephritis and also inflammatory lesions of the endocardium and tunica intima of the aorta and pulmonary artery, (3) a chronic form, which is subclinical and is characterized by thickening and calcification of the vascular sites mentioned above, and also of the parietal pleurae and pericardium, (4) a form whose course lasts months or years, clinical symptoms being seen intermittently. In this form, acute, subacute, and long standing lesions are found together.—E. W. Ascoli.

Yakimoff, W. L., Rastégaieff, E. F., Matschoulsky, S. N., & Titkoff, A. D. (1936). Zur Frage der Masseninfektion von Kaninchen mit der Spirochätose (*Treponema cuniculi*). [**Rabbit Spirochaetosis**].—*Z. ImmunForsch.* **88.** 406-415.

A mass infection of rabbits with spirochaetosis was observed in the U.S.S.R. The success of treatment with arsenical salt preparations confirmed the work of earlier authors. Preparations of bismuth, even in small doses, checked the progressive spread of the disease. Emphasis is laid on the advisability of adequate disinfection of cages and quarantine of animals in the event of an outbreak of the disease.—C. Horton-Smith.

DISEASES CAUSED BY VIRUSES.

Sálvi, G. (1937). Elsőrendu sejtzárványok az ultravirusos betegségeknél. [**Inclusion Bodies in Virus Diseases**].—*Állatorv. Lapok.* **60.** 185-191.

A review of the literature on the most important inclusion bodies found in virus diseases and a statistical record of the incidence of Negri bodies in cases of rabies observed at the State Veterinary Hygiene Institute in Budapest.

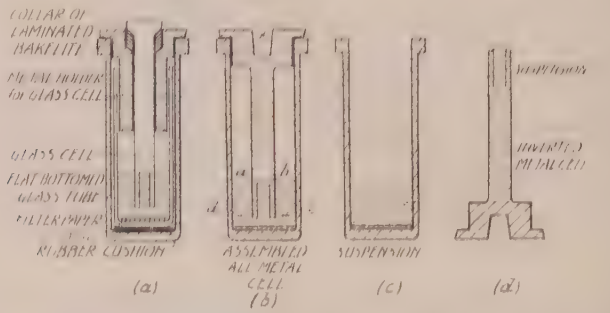
Negri bodies were found in 90·9% of 535 dogs, in 72% of 33 cats, in 67·9% of 196 ruminants, in 45·2% of 93 pigs and in 31·6% of 19 equines, all with naturally contracted rabies.

I. Elford, W. J., & Galloway, I. A. (1937). **Centrifugation Studies : III. The Viruses of Foot-and-Mouth Disease and Vesicular Stomatitis.**—*Brit. J. exp. Path.* **18.** 155-161. 2 tables. [9 refs.] [See also *V. B.* **7.** 381].

II. Tang, F. F., Elford, W. J., & Galloway, I. A. (1937). **Centrifugation Studies : IV. The Megatherium Bacteriophage and the Viruses of Equine Encephalo-Myelitis and Louping Ill.**—*Ibid.* 269-275. 3 tables. [14 refs.]

I. The particle diameters of these viruses have been studied by the inverted-capillary tube technique. The sedimentation rate of the virus particle is determined by the drop in concentration of the virus after spinning the virus suspension for 2 or 3 hours at 11,000 r.p.m., the diameter of the particle being calculated from the sedimentation rate. For F. & M. disease virus the particle size is 20 $m\mu$ when the density of the virus is 1·30; by ultrafiltration the diameter is 8-12 $m\mu$. The rates of sedimentation of the virus after filtration through membranes of different porosities are similar, and indicate that the virus particles are of uniform size.

All strains are found to have the same particle size. For vesicular stomatitis virus, the particle diameter is found to be 60-74 *mμ* by centrifugation according to whether the density is assumed to be 1·30 or 1·20 respectively. By ultrafiltration the diameter is calculated as 70-100 *mμ*.



Brit. J. exp. Path. p. 404, Vol. XVII.

[The inverted capillary tube apparatus is illustrated in the accompanying diagram; (a) represents the original cell; (b, c, and d) show the apparatus as it is now used. The apparatus consists of a metal centrifuge bucket (c) and a solid metal rod (d); the end of the rod is drilled with holes of uniform size, each hole forming a single cell. The absence of a free surface eliminates evaporation and certain vibrational disturbances. After spinning, the complete contents of the cell may be withdrawn for analysis and a comparison made with the unspun suspension. The diameter of the virus particle is calculated from the relationship of the fall in concentration of the virus after spinning at a given speed for a known time. For this calculation the density of the virus particle must be known, and this is obtained from the relationship of the density of the particle to the density of the suspending medium. By varying this medium the rate of sedimentation of the virus particle is altered, and the density of the particle may be evaluated].

II. A study of the probable particle sizes of these agents by centrifugation as compared with the values already obtained by ultrafiltration. The inverted capillary tube technique was employed.

A stock filtrate of the *megatherium* bacteriophage was filtered in a broth plus Ringer medium through graded collodion membranes; the particle diameter of the phage was found to be 30-45 *mμ*. By centrifugation of the purified and unpurified preparations of the phage, the particle size was calculated to be 30-37 *mμ*.

Equine encephalomyelitis virus was examined after mouse and g. pig passage, and also after culture on hens' eggs. By ultrafiltration the particle size was 25-35 *mμ*. By centrifugation the diameter was calculated as 32-39 *mμ*. For "louping ill" virus the diameter by ultrafiltration and centrifugation was 15-20 *mμ* and 22-27 *mμ* respectively.

The particle size values are found to be in close agreement by both methods.

—E. C. Hulse.

Poppe, K., & Busch, G. (1930). Physikalische und chemische Untersuchungen am Virus der Maul- und Klauenseuche. I. Isoelektrische Punkt und Adsorption. [**Physical and Chemical Investigations on Foot and Mouth Disease Virus. I. Isoelectric Point and Adsorption**]. *Z. ImmunForsch.* **68.** 510-518. 1 fig., 11 tables. [Numerous refs.]

Busch, G. (1934-1935). Physikalische und chemische Untersuchungen am Virus der Maul- und Klauenseuche. II. Filtration und Ultrafiltration. III. Zentrifugierungsversuche. IV. Mitteilung. Oberflächenspannung des Serums infizierter Meerschweinchen. [**Physical and Chemical Investigations on Foot and Mouth Disease Virus. II. Filtration and Ultrafiltration. III. Centrifugation Trials. IV. Surface Tension of the Serum of Infected Guinea Pigs**].—*Ibid.* **75.** 871-880, **82.** 170-174 and **85.** 187-194. 5 tables. [Numerous refs.]

I. Types Vallée A and O and Riems type R virus were obtained from g. pig vesicles and submitted to test in a U-tube apparatus described in detail. The iso-electric point of the A and R viruses was found to be at a pH of 7·6-7·8 and that of the O virus at pH 8·0.

Vallée O virus was adsorbed readily by "carbo medicinalis" Merck (wood charcoal), only slightly by animal charcoal and not at all by kaolin.

II. G. pig vesicle virus was suspended in a 2·5% potassium phosphate buffer solution and passed through various filters, different lots being adjusted to pH 6·5, 7·5 and 8·5 respectively. All virus suspensions passed readily through Berkefeld V and N filters at each pH and through Berkefeld W filters except to some extent, those at pH 6·5. Seitz asbestos filters readily allowed the virus to pass through. Numbers 8, 30, 50, 70 and 83 of the nitrocellulose filters of Zsigmondy and Bachmann let the virus pass through at all the pH values and number 200, a very fine filter, allowed it to pass at pH 7·5 and 8·5, but not at pH 6·5. Bechhold's porcelain filters (grades 1% to 10% inclusive) allowed the virus to pass at a pH of 7·5, 8·0 and 8·5, but retained it at pH 6·5 and 7·0.

III. Using an "Ecco-super-rapid" centrifuge turning at 10,000 r.p.m. and applying the formula of Bechhold and Schlesinger to calculate particle size, it was found that the size of F. & M. disease virus is below 80 *mμ*.

IV. The surface tension of fresh serum from g. pigs before and during F. & M. disease was determined by the adhesion ring method. It was found to rise above normal during the first four days following inoculation and then to fall below normal, the latter change being regarded as connected with the development of immunity. G. pigs inoculated with virus and antiserum did not develop increased surface tension.—J. E.

I. Pyl, G. (1936). Ueber eine zweite Form des Maul- und Klauenseuche-Virus. [**A Second Form of Foot and Mouth Disease Virus**]. *Hoppe-Seyl. Z.* **244.** 209-217. 2 figs., 1 table. [6 refs.]

II. Langenbeck, W., & Enderling, Annemarie. (1937). Einfluss der Vitamine auf das Virus der Maul- und Klauenseuche. [**The Influence of Vitamins on F. & M. Disease**]. *Zlb. Bakt. I. (Orig.).* **140.** 112-115. 2 tables. [2 refs.]

III. Peragallo, I. (1937). Untersuchungen über das Aphthenvirus. 1. Mitteilung: Gedeihen des Aphthenseuchevirus auf der Chorioallantois von Hühnerembryonen und seine serienweise Uebertragung. [**Research on F. & M. Disease Virus. Cultivation on the Chorio-Allantoic Membrane of the Chick Embryo**].—*Ibid.* 116-117. 2 figs.

I. A form of F. & M. disease virus thought to be alive but non-virulent was obtained when virus was held in alkaline or acid media. This variant did not exist when the pH approached neutrality, which is the optimum zone for virulent virus, and it is thought to be an intermediate stage of disintegration of virus by H or OH ions. Its precise significance from an immunological standpoint has not yet been investigated.

II. Vitamins A, B_1, B_2, C and D were tested both *in vitro* and *in vivo* to see if any of them could exert a destructive influence upon F. & M. disease virus. Vitamin C was the only one that appeared to have any effect. *In vitro* strong concentrations destroyed the virus, but in experiments carried out entirely *in vivo* no such effect could be demonstrated.

III. A brief report of the culture of F. & M. disease virus on the chorio-allantoic membrane of chick embryos.—E. J. Pullinger.

I. Toussieng, E. (1937). Om aktiv Immunisering af Kalve mod Mund- og Klovesyge med Virus adsorberet til Aluminiumhydroksyd. [**Immunization against Foot and Mouth Disease by Virus Adsorbed in Aluminium Hydroxide**]. —*Maanedsskr. Dyrlaeg.* **49.** 33-40. 1 table. [1 ref.] [Also appeared in *Bull. Off. internat. Epiz.* **7.** No. 3].

II. Jensen, E. F. (1937). Dyrkningen af Mund- og Klovesygesmitstof. [**Culture of F. & M. Disease Virus**].—*Ibid.* 40-47. 1 fig.

I. A method of vaccination against F. & M. disease advocated by Schmit-Jensen *et al.* [*V. B.* **7.** 420.], was tried on farm animals as a result of work on g. pigs. The vaccine was prepared by adsorbing the virus on to aluminium hydroxide. The chief work consisted of preliminary tests and informatory investigations.

Forty calves, ten pigs and about one thousand g. pigs were used in the experiments. Fifteen calves were vaccinated by different routes with different strains of virus. In some cases the vaccination seemed to produce a certain amount of resistance to subsequent exposure to infection by contact. The results were, however, not convincing, and too few to allow any general conclusions to be drawn.

II. J. briefly reviews earlier successful experiments on the artificial cultivation of F. & M. disease virus and describes the outlines of Frenkel's method [*V. B.* **6.** 324.], which, since 1935, has been adopted at the State Veterinary Experiment Station for Virus Diseases on the Isle of Lindholm (Denmark). The medium used is the skin of calf foetuses (tissue culture).—G. Naerland (Oslo).

I. Phadke, V. R., Deen, M. M., & Hardikar, G. A. (1937). **Some Observations on the Viability of Rinderpest Goat Virus under Different Conditions.** —*Indian vet. J.* **14.** 113-117.

II. Pershad, N. (1937). **A Brief Note on the Goat Tissue Vaccine Inoculation against Rinderpest in H. E. H. The Nizam's Dominions.**—*Ibid.* 117-120.

I. The loss of virulence of infective blood was more rapid after storage at room temperature on hot days (98°-102°F.) than on cool days (80°-84°F.). After cold storage the blood was still infective 19 days later; the reactions given by the virus were in direct proportion to the number of days' storage. The virulence of saline spleen extracts decreased rapidly when exposed to room temperature. The virus was conserved in spleen tissue after 40 days' storage in the refrigerator. [No details of the conditions of the experiment, *e.g.*, method of storage, carbon dioxide tension, pH of the blood before and after storage, etc., are given by the authors].

II. Details are given of the technique used in this method of vaccination and the apparatus required for its employment in the field. The vaccine is prepared from the spleen of infected goats killed on the fifth day of the febrile reaction. The spleen is removed aseptically and emulsified in 0·5 saline. The dose is 1 c.c. —E. C. Hulse.

Curasson, G. (1937). Le vaccin saponiné contre la peste bovine. (Nouvelles observations). [**Experience of Saponin Vaccine against Rinderpest**].— *Bull. Acad. vet. Fr.* **10.** 328-331.

Large-scale field experiments are described which were undertaken in French Equatorial Africa to investigate the following points concerning saponin vaccine as prepared by C. [*V. B.* **8.** 26.] :– the duration of its potency after manufacture in the field ; the appearance of virus in the blood of the animals, and the duration of the immunity produced. The vaccine is active up to at least 24 hours after its preparation. The virus appears in the blood of the animals inoculated and they are infective. Immunity certainly lasts for four months, and probably much longer.

The advantages claimed for the vaccine are the facility of its production in the field, the low cost of production (1,000-1,500 doses can be prepared from the spleen of one calf), and the fact that the immunizing dose consists of one inoculation. The disadvantage is that the reactions produced in different individuals and in different herds may vary considerably in degree. The known difference in susceptibility to rinderpest of certain breeds of cattle and of herds in certain regions, accounts for the herd variation : the difficulty can be overcome by varying the amount of vaccine given. The individual variations in reaction are due to individual susceptibility to saponin and are not easily dealt with, but the number of animals seriously affected is not large enough to prejudice gravely the use of the vaccine. The total mortality due to the vaccine when properly prepared and administered is less than that caused by serum-virus inoculation.—G. Williamson.

I. Zwick, W., Witte, J., & Schwarzmaier, E. (1937). Zur Frage der Pluralität des Bornavirus. [**The Plurality of Borna Disease Virus**].—*Z. InfektKr. Haustiere.* **51.** 261-267. 2 tables. [7 refs.]

II. Schwarzmaier, E. (1937). Erfahrungen bei der Feststellung der Bornaschen Krankheit. [**The Diagnosis of Borna Disease**].—*Arch. wiss. prakt. Tierheilk.* **72.** 167-180. 6 figs., 5 tables. [Numerous refs.]

I. Rabbits were immunized by the administration of subcutaneous injections of various strains of virus, and their immunity to other strains of virus was then tested. In all cases the rabbits proved immune to heterologous virus strains. thereafter, working with two virus strains claimed by other workers to be distinct from one another, the authors showed by cross-immunization experiments that no such difference existed. It is concluded that all strains of Borna virus are probably identical.

II. Histological examination of nervous tissue offers an extremely reliable method of diagnosing Borna disease. Out of one thousand suspected cases of Borna infection examined, 546 were shown by histological examination to be positive and 423 negative, while only 16 were doubtful. A rapid method for carrying out a comprehensive histological examination of various portions of the brain is given. The characteristic lesion seen in Borna disease is a perivascular lymphocytic infiltration ; the presence of inclusion bodies helps to confirm the diagnosis. Intracerebral inoculation of rabbits should be resorted to in all doubtful cases, brain emulsion being used for this purpose.—E. J. Pullinger.

I. Oellerich. (1937). Ansteckende Blutarmut der Pferde. [**Equine Infectious Anaemia**].—*Dtsch. tierärztl. Wschr.* **45.** 23-28.

II. Rust, W. (1937). Die Notwendigkeit der Einführung der Anzeigepflicht bei der ansteckenden Blutarmut. [**Necessity of making E.I.A. Notifiable**].—*Ibid.* 38-40.

III. Hofferber, O. (1937). Ueber Ursache und Wesen der ansteckenden Blutarmut der Einhufer. [**E.I.A.**]—*Ibid.* 49-54. [Numerous refs.]

I. O. describes his 15 years' experience of E.I.A. in the district of Kassel the most heavily affected area in Germany. The clinical characters of the various

forms of the disease, diagnosis and control measures are dealt with at length.

II. R. gives a similar account of E.I.A. in Silesia from 1921 onwards. He advocates that it should be made notifiable, notwithstanding the difficulty of rapid diagnosis and of the tracing of infective animals.

III. A valuable review of present knowledge of E.I.A. with special reference to its history in Prussia [see also *V. B.* **7.** 597].

[These articles are full of detailed information and should be read in the original].—F. Freudenberg (Hamburg).

Nicolau, S., Cruveilhier, L., & Kopciowska, L. (1937). Etude sur la pseudorage (maladie d'Aujeszky) expérimentale. [**Experimental Study of Aujeszky's Disease**].—*C. R. Soc. Biol. Paris.* **126.** 563-565. [9 refs.]

This article describes the periods between inoculation and death in rabbits, g. pigs and mice, when different routes are followed. There is little variation between rabbits and g. pigs, but mice are somewhat more resistant. Negative results were obtained following inoculation of a dog and a monkey. Pigeons died in 4-7 days, but fowls were more resistant. In rabbits the virulence of the virus is suppressed in dilutions greater than 1 : 10,000. Rabbits immunized against herpes virus are susceptible to the virus of Aujeszky's disease. Histological examination shows an encephalomyelitis which is more marked in Ammon's horn. In the spinal cord the neurons of the posterior horn are chiefly affected. The authors agree with Remlinger that the experimentally produced disease has little resemblance to rabies, and consider that the title " pseudorabies " should not be applied to it.—S. J. Gilbert.

I. Hirt, G. (1936). Szöveti elváltozások a kifejlett sertés, a szopós malac és a juh középponti idegrendszerében Aujeszky-féle betegség esetén. [**Lesions in Pigs and Sheep Affected with Aujeszky's Disease**].—*Közl. Oesszehas. élét- és kortan körébol.* **26.** 631-646. 8 figs. on 2 plates, 1 graph, 1 table. [Numerous refs.]

II. Hirt, G. (1937). Au Aujeszky-féle betegség virusát közömbösitő virulicid savókról. [**Antiserum against Aujeszky's Disease**].—*Állatorv. Lapok.* **60.** 71-75. [Numerous refs.] [Also appeared in *Arch. wiss. prakt. Tierheilk.* **72.** 78-88].

I. Histological examinations were made of the central nervous system in 23 pigs, 11 piglets and two sheep with Aujeszky's disease. In all cases lymphocytic non-purulent encephalomyelitis was found extending to the grey and to the white substance equally. In the piglets the main change was in an overgrowth of the glia cells which was particularly evident in the dorsal grey horns of the spinal cord, a cellular infiltration of the meninges and severe derangement of the nerve cells. The latter occurred to a smaller degree in adult animals. No inclusion bodies were seen. The tissue changes developed in the piglets 1-3 days and in the adults 2-6 days after the appearance of the first symptoms, with a severity that did not vary directly with the symptoms. The same changes were found in four artificially infected pigs, but not in 6 artificially infected sheep.

II. Graded amounts of serum from hyperimmune pigs were mixed with Aujeszky's disease virus (filtered lung tissue) at room temperature and at the end of 30 minutes were injected into rabbits. Hyperimmune serum in doses of 0·0025 c.c. neutralized 25 M.L.D. of virus, whilst that from convalescent pigs neutralized the virus in amounts of 0·01-0·5 c.c. These immune sera were, however, ineffective *in vivo* as were also samples of serum from normal pigs and pigs immune against swine fever.—G. Sályi (Budapest).

Remlinger, P., & Roumy, B. (1937). Un cas de rage à forme prurigineuse simulant la maladie d'Aujeszky. [**A Case of Rabies Simulating Aujeszky's Disease**].—*Bull. Acad. vét. Fr.* **10.** 356-358. [1 ref.]

A donkey, showing eczematous patches and intense irritation of the skin died the day after these signs appeared. Symptoms of paralysis only appeared a few hours before death. Inoculation of brain and medulla into rabbits and g. pigs gave a diagnosis of rabies. There was no evidence of the animal having previously been bitten. The authors draw attention to the necessity of confirming by inoculation all suspected cases of Aujeszky's disease which, as in the present case, may resemble certain types of rabies.—S. J. Gilbert.

Snyman, P. S. (1937). **Rabies in South Africa.**—*J. S. Afr. vet. med. Ass.* **8.** 126-133. [7 refs.]

A short review is given of the history of rabies in South Africa, followed by a list of the areas in the country where cases of the disease have been recorded. These areas comprise most of the Orange Free State and adjacent portions of the Transvaal and Bechuanaland. Rabies has been diagnosed in man, in the ox, sheep, pig, dog, and cat, and in the yellow mongoose, genet cat, wild cat, ground squirrel and stockstert. S. goes into the question of whether the disease is actually spreading or is only being diagnosed in new places. He considers that both alternatives are correct. It would appear that the heavy rains of the summer of 1933-1934 resulted in greatly decreased incidence of the disease, probably owing to the drowning of large numbers of meercats in their burrows. S. considers that educational propaganda is the most valuable means of teaching the public the danger of handling meercats and of keeping them as pets. The usual methods of dealing with outbreaks are discussed in detail.—E. M. Robinson.

Baker, J. N., McAlpine, J. G., & Dowling, J. D. (1936). **Rabies: a Continuing Challenge.**—*Sth. med. J.* **29.** 547-557. 8 charts. [3 refs.]

Rabies has increased in recent years in the southern states of the U.S.A., and during the period of 1929-1934 examination for rabies gave positive results in the brains of 4,256 animals in Alabama; 2,912 in Tennessee, 2,757 in Texas, 2,379 in Georgia, 1,079 in Mississippi and 496 in Florida. The incidence rose in Texas and Alabama and fell sharply in Florida during that period. 86% of the domestic animals concerned in cases of human rabies were dogs, 6·3% were cows and 4·8% cats, the rest being horses, "rats, goats, hogs, foxes, rabbits and monkeys".—J. E.

Wiebel, H. (1937). Ueber Louping ill beim Menschen. [**Louping Ill in Man**].—*Klin. Wschr.* **16.** 632-634. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 778. Signed R. Lovell].

Rivers and Schwentker recorded four cases of louping ill in laboratory workers in which encephalitis but not cerebellar ataxia was present. The brief details of their cases are reproduced in this paper followed by a complete record of another case occurring in a worker in a serological laboratory. It is believed to be the first recorded case of its kind on the continent and special mention is made of the cerebellar ataxia which is a prominent symptom in clinical cases in sheep, but was not apparent in the previous cases. A proportion of the mice injected intracerebrally with either haemolysed blood or serum of the patient exhibited symptoms of paralysis and there was no evidence of any bacterial infection. Furthermore, the serum of the patient neutralized louping ill virus when tested in mice, whilst sera from other laboratory workers failed to do so. This evidence is considered to be sufficient to indicate the nature of the disease.

Donatien, A., & Lestoquard, F. (1936). Le diagnostic de la peste porcine. [**Diagnosis of Swine Fever**].—*Arch. Inst. Pasteur Algér.* **14.** 295-331. [Numerous refs.]

The difficulties associated with the differential diagnosis of S.F. from other diseases of the pneumo-enteritis group, are indicated. The following points are significant :–

Epidemiology.—S.F. occurs in any season, whilst swine erysipelas occurs chiefly in summer and pasteurellosis chiefly in winter. S.F. attacks pigs of all ages, S.E. only those over three months old, pasteurellosis those 3-6 months old and piglet influenza those 2-6 weeks old.

Clinical Syndrome.—The clinical signs of S.F. are described. These are not diagnostic ; typically, however, the disease follows a progressive course, the whole herd tending to become infected, and the mortality is from 80-95%, being highest in finely bred pigs.

Pathology.—Acute S.F. is characterized by haemorrhagic inflammation of the serous and mucous membranes, which may or may not be generalized, and the P.M. appearance is characteristic. Histology is a great aid to diagnosis [see *V. B.* **5.** 212].

Therapeutic Diagnosis.—The administration of S.F. or S.E. antiserum to in-contacts is of diagnostic value.

Laboratory Diagnosis.—Advice is given on the collection and treatment of samples of material for :– (1) bacteriological tests, (2) agglutination tests, (3) biological tests in healthy pigs, and (4) the intradermal test, and their value is discussed ; (4) refers to the original method of Sarnowiec, modified by the Pasteur Institute of Algeria, in which the intradermal injection of " suspect " blood plus castor oil is made into a pig known to be immune [see *V. B.* **6.** 234, and **7.** 309]. The evaluation of the reaction is based on skin fold measurements made before, and 24 hours after the injection. Healthy pigs and those affected with S.F. do not react to this test. Full details and protocols are given.

The test is not a direct one that can be applied to the animal under suspicion as *e.g.* is the tuberculin test, although Sarnowiec [*V. B.* **4.** 728.] made this claim.

The authors claim that this test is rapid and certain and that it is the best diagnostic method now available.—F. H. Manley.

Geiger, W. (1936). Neuere Ergebnisse der Diagnose und Bekämpfung der Schweinepest. [**Diagnosis and Control of Swine Fever**].—*Dtsch. tierärztl. Wschr.* **44.** 865-868.

An attempt was made to facilitate the diagnosis of swine fever by histological or serological methods—Weil-Felix-Köbe reaction [below] Zŭverkalow and Kŭtocherenko's precipitation method [*V.B.* **5.** 574.], and Sarnowiec's test [*V.B.* **4.** 728].

None of the above experiments were successful. The best method for diagnosis is experimental infection of healthy swine. G. pigs were of no practical value for this purpose. Active immunization with formol vaccine failed and sometimes proved to be dangerous. Simultaneous inoculation with highly virulent virus (3-4 c.c.) and serum (1 c.c. per kg. body weight) is the best known method for healthy pigs. The risk of making carriers is small, as the excretion of virus ceases after four weeks.—G. Hartmann (Vienna).

Köbe, K. (1933). Weil-Felix-Reaktion bei Schweinepest. [**The Weil-Felix Reaction in Swine Fever**].—*Dtsch. tierärztl. Wschr.* **41.** 241-242. 3 tables. [2 refs.]

K., observing that typhus fever and S.F. have some qualities in common, tested the value of the Weil-Felix reaction on pigs with S.F., using various *Proteus* strains as antigen. The results were all negative.—J. E.

I. Salvalaglio, P. (1937). La diagnosi istologica della peste suina. [**Histological Diagnosis of Swine Fever**].—*Clin. vet., Milano.* **60.** 322-333. 6 figs. [Numerous refs.]

II. Ubertini, B. (1937). Peste suina e sua profilassi. [**Prevention of S.F.**].—*Azione vet.* **6.** 369-373.

I. S. emphasizes the difficulty of diagnosis from clinical symptoms alone, since the disease varies in form and is not seasonal. He describes the different forms of the disease, their symptoms, and P.M. appearances both macroscopical and microscopical, illustrating the latter with plates. He discusses differentiation between swine influenza and swine fever. He admits that no rapid and reliable method of diagnosis has as yet been found, and his final conclusion is that the only certain diagnosis can be made from the P.M. lesions in the brain [see *V. B.* **5.** 212].

II. U. points out the difficulty of making a certain and immediate diagnosis. He does not recommend isolation of suspected cases and contacts, as the conditions under which large herds of pigs are necessarily kept render this method of prevention impracticable. He believes in serum-virus inoculation as the only practical method, and cites America where this is widely adopted. U. regrets that no cheap and certainly effective vaccine is at present available.—S. F. J. Hodgman.

Nagel, H. C. (1937). Untersuchungen über die Aetiologie der Kalberpneumonien. [**Causation of Calf Pneumonia**].—*Berl. tierärztl. Wschr.* June 11th. 363-365. 1 table.

N. investigated at the Riems Research Institute a calf pneumonia that was occurring in Germany with a death rate up to 15%. Affected lungs were removed and a tissue suspension obtained from them was filtered, some through cotton and some through Seitz filters. The filtrates were sprayed into the nostrils of healthy calves or rubbed on to the nasal mucous membrane, or injected in the trachea. Infection was thereby transmitted to 11 out of 25 cases in which cotton filtrate was used, and in one out of four cases in which the Seitz filtrate was used.

Similar tests with bacterial cultures (*Pasteurella* and *Bacterium coli*) obtained from affected lungs gave negative results. The pneumonia set up by lung filtrate was passaged five times in calves and it was ascertained that infection was in no way due to bacteria originally present in the lungs of the natural cases. It is concluded that a virus was responsible for this type of pneumonia.—G. H. (Vienna).

Jones, F. F. (1937). **Heartwater.**—*Rep. vet. Dep. N. Rhod. 1936.* pp. 71-76.

Heartwater is the cause of serious loss to farmers in the Choma District, and at least 90% of alleged outbreaks of veldt poisoning are said to be due actually to heartwater. Differential diagnosis is sometimes difficult—especially in the acute form in which the only more or less constant symptom is acute inflammation of the abomasum. In such cases the demonstration of rickettsia in smears prepared from vascular endothelium (Leishman stain) alone allows a definite diagnosis. In the subacute form an exaggerated inco-ordination of movement is often the first symptom and the characteristic fluid is more constantly present than in the acute form.

Short-interval (five-day) dipping of all animals between October and March is recommended as the only known method of controlling the disease. Judicious

burning of grass is advocated as an aid to the prevention of the breeding of the bont tick.—F. J. Andrews.

Sayer, S. W., & Amos, F. B. (1936). **Outbreak of Cowpox, Caused by a Vaccination, Involving Two Families and Two Herds of Cattle.**—*N. Y. St. J. Med.* **36.** 1163-1165. [Abst. from abst. in *Bull. Hyg., Lond.* **11.** 901-902].

Three persons on a dairy farm were vaccinated against smallpox, two reacting normally and one severely. The latter, a girl, and one of the other two, milked cows daily.

Thirty-five days after vaccination and 12 days after the lesions had healed, cowpox was discovered among the dairy animals, the first cases being noticed among those milked by the girl. All but two of the other milkers on the farm became ill; of these all but four had never been vaccinated.

The girl went to milk cows on another farm, and cowpox appeared there eight days later, while she herself developed a pox lesion on the little finger sixteen days later. Three members of another family who milked this herd also became ill. There had been no other recent outbreak of cowpox in neighbouring herds and the authors conclude that recently vaccinated persons should not be allowed to look after dairy animals.

I. Moriyama, H. (1937). **Reversible Inactivation of Vaccinia Virus by Acid.**—*J. Shanghai Sci. Inst.* **2.** 291-295. 5 tables. [6 refs.] [In English].

II. Gordon, M. (1937). **Virus Bodies. John Buist and the Elementary Bodies of Vaccinia.**—*Edinb. med. J.* **44.** 65-71. 2 figs. on 1 plate. [Numerous refs.]

III. McMaster, P. D., & Kidd, J. G. (1937). **Lymph Nodes as a Source of Neutralizing Principle for Vaccinia.**—*J. exp. Med.* **66.** 73-100. 9 text figs. [13 refs.]

I. Purification of crude glycerinated lymph is described. The activity of the virus was determined by intracutaneous injection in the rabbit. The action of virus, which is lost by reducing the pH to between 3·0 and 5·0, can be restored by neutralization. Inactivation occurs gradually, whereas recovery is rapid.

II. Comprehensive research has shown that a virus can be detected serologically. A very brief review is given of recent work bearing on the particulate nature of viruses. Specific soluble substances can be extracted from the elementary bodies giving a precipitation reaction with antivaccinia serum. These bodies are antigenically complex. There is no cross-agglutination between the bodies of vaccinia and those of fowl pox. A historical note on the discovery of these bodies is given.

III. Intradermal infection truly develops along the lymphatic system, and in the rabbit's ear always passes through the same channels to lymph nodes at the junction of the internal and external jugular veins. Vaccinia virus has been demonstrated in the nodes 48 hours after injection. The preparation of virus suspension, methods of inoculation and determination of presence of virus in the nodes are described. Three days after injection the amount of virus in the nodes was at its maximum. Differences in the quantity of virus in the nodes were attributed to changes taking place after the virus had reached them. Extracts of normal nodes had only the very slightest inhibitory action on the development of vaccine virus lesions.

Experiments are described giving the results of neutralization tests. Rabbits were killed at varying times after injection of virus into the ear, and antiviral principle was demonstrated in serum, spleen, bone-marrow and lymph nodes.

No principle was found in ear-tissues. The authors consider that antiviral principle is, therefore, elaborated within the regional lymph nodes and immunity conferred by clinical Jennerian vaccination may be largely of lymph node origin.—F. H. M.

I. Kaiser, M., & Gherardini, Maria. (1937). Experimentelle Untersuchungen über die durch Subcutane Impfungen erworbene Vaccine-immunität. [**Experimental Subcutaneous Vaccination against Vaccinia**].—*Z. Hyg. InfektKr.* **119.** 706-715. 10 tables. [4 refs.]

II. Echenique-Guzman, E. (1937). Zur Frage der Virusänderung durch Kultur in befruchteten Hühnereiern und der Beziehung zwischen Variolavakzine und Geflügelpocken. [**Modification in Viruses Cultivated on Fertile Hens' Eggs. Connexion between Cow Pox and Fowl Pox**].—*Zlb. Bakt. I. (Orig.).* **139.** 314-325. 4 figs. on 2 plates, 3 tables. [Num. refs.]

I. A study of the value of the subcutaneous vaccination of rabbits, g. pigs and cows as a prophylactic measure against vaccinia. Four subcutaneous inoculations of virus were given at intervals of 48, 104 and 184 days respectively. In the case of the rabbit and g. pig the local reaction was progressively smaller after each inoculation, and it is concluded that in these animals a strong immunity had gradually been built up by vaccination. In the case of the cow the effect was less satisfactory, but it is thought that a heavier or more prolonged course of vaccination would have produced an equally effective immunity.

II. Naturally occurring vaccinia and fowl pox viruses are distinct immunologically and produce different histological reactions. Culture of vaccinia virus on the chorio-allantoic membrane of eggs resulted in slight variation of the mammalian virus towards the avian type, which became noticeable by the tenth egg passage. Such egg passaged mammalian virus produced a fairly typical attack of fowl pox in birds. After 20 egg passages the mammalian virus still retained its ability to produce a fairly typical onset of disease in rabbits. The results recorded are considered to support the opinion that mammalian and avian pox viruses are variants of a single parent stock.—E. J. Pullinger.

I. Plotz, H. (1937). A propos de la virulence d'une culture de peste aviaire cultivée *in vitro* pendant 5 ans. [**Virulence of Fowl Plague Virus Cultivated *in vitro* for Five Years**].—*C. R. Soc. Biol. Paris.* **125.** 602-603.

II. Plotz, H. (1937). Etude comparative de la virulence des cultures de peste aviaire effectuées en présence de cellules non proliférantes et en présence de cellules en voie de prolifération. [**Comparative Virulence of Fowl Plague Virus Cultures in Non-Proliferating and in Proliferating Cells**].—*Ibid.* 603-604.

I. Fowl plague virus was sub-cultivated 250 times in five years. A gradual exaltation in the virulence was noted, the maximum virulence occurring after 100 sub-cultivations. It remained practically constant for four years and then gradually diminished to about one twentieth of its previous titre.

II. P. found that fowl plague virus incubated for three days at 37°C. in media containing proliferating cells (tissue culture) was 10-100 times more virulent than virus cultivated in the absence of such cells. Further experiment showed that after 15 generations in tissue culture in which fowl plasma was present the virulence of the virus was exalted 100 times.—J. E. Wilson.

I. Andrewes, C. H. (1937). **Influenza: Four Years Progress.**—*Brit. med. J.* September 11th. 513-515. [17 refs.]

II. Hoyle, L., & Fairbrother, R. W. (1937). **Antigenic Structure of Influenza Viruses; the Preparation of Elementary Body Suspensions and the Nature**

of the Complement-Fixing Antigen.—*J. Hyg., Camb.* **37.** 512-520. 5 tables. [9 refs.]

I. Intranasal instillation of garglings from influenza cases produces in ferrets a nasal discharge and a typical diphasic temperature reaction; infection is also transmissible by contact. Inoculation of suspensions from infected exudate around the turbinate bones into the respiratory system under anaesthesia produces extensive lung lesions. The virus can be passaged directly from man to the mouse, but it requires to be adapted to mice before they develop lesions.

In mice, lesions occur in the lungs only; the infection is non-contagious. In ferrets the nasal passages are affected and the disease is contagious. Recovered ferrets are resistant to reinfection for three months; the immunity decreases after six months. Ferrets are not infected by subcutaneous inoculation of virus; such inoculation will, however, produce some immunity, especially when several doses are given.

Mice may be vaccinated in a similar manner. An important result of immunization studies was the finding that virus inactivated by 1 : 5,000 formaldehyde is almost, if not quite, as effective an antigen as living virus. Washed, protein-free virus filtrate is equally effective. If this filtrate is formolized, however, its antigenic properties are lost.

II. The influenza virus contains two antigenic components, the elementary body and a soluble complement-fixing antigen. The technique for the preparation of the elementary body suspension is described. On dark-ground examination the suspensions contain numerous minute uniform particles. Mice may be protected completely against intranasal inoculation of the virus by a double intraperitoneal inoculation of the suspension.

The complement-fixing antigen is a filtrable, soluble, and comparatively heat-labile substance; it is destroyed by alkali, but is somewhat resistant to N/5 HCl. The complement-fixing antibody is liberated during the multiplication of the virus in the tissues. After subcutaneous and intravenous vaccination with elementary body suspensions, potent neutralizing sera are produced in ferrets and rabbits; the complement-fixing antibody is not demonstrable in these sera, however. The vaccine must contain a large amount of the antigen before the complement-fixing antibody is liberated in the serum of inoculated animals.—E. C. Hulse.

Gerlach, F. (1936). Menschen als Psittakosevirusträger nach "stummer" Infektion mit Psittakosevirus. [**Man as a Carrier of Psittacosis Virus**].—*Z. Hyg. InfektKr.* **118.** 709-723. 10 figs.

It is emphasized that not only birds, but also human beings may act as carriers of psittacosis virus for many days after recovery from the disease, and that whilst carrying infection it may be present in the sputum. The suggestion is also raised that human beings who come in contact with birds may possibly develop subclinical attacks of the disease and subsequently act as carriers without anyone suspecting that they have ever been infected. The significance of the human carrier problem is discussed.—E. J. Pullinger.

PARASITES IN RELATION TO DISEASE [ARTHROPODS].

Hoare, C. A. (1935). **The Development of Trypanosomes in Tsetse-Flies in Relation to the Peritrophic Membrane.**—*Inst. exp. Med., Moscow. Coll. Works. Commem. 25th Anniv. Prof. Pavlovskii, 1909-1935.* pp. 367-372. 2 figs. [9 refs.] [In English: Russian summary].

It is explained that the peritrophic membrane arises as a secretion from the epithelial ridge at the commencement of the midgut, and forms a chitinous sheath enclosing the blood ingested by tsetse-fly and acting as a dialyser in the process of digestion. It is produced as a continuous stream from the anterior end, the posterior part being discarded as it advances down the hindgut.

In the development of *Trypanosoma grayi* and *Tryp. brucei*, the parasites enter the endoperitrophic space with the ingested blood and develop there for six and four days respectively. They then pass backwards towards the rectum, but after passing the free end of the peritrophic membrane they pass forward again into the ectoperitrophic space, and there continue their development. In the case of *Tryp. grayi* the cyclical forms pass back into the rectum, but in the case of *Tryp. brucei*, developing forms pass forward and penetrate the peritrophic membrane at the point where it is in process of secretion from the epithelial ridge, thus reaching the inner lumen of the proventriculus. From this position they pass forward to the hypopharynx and the salivary glands where the metacyclic forms are produced. Since developing forms of *Tryp. congolense* have also been detected in the ectoperitrophic space, it is thought that their development is similar to that of *Tryp. brucei* except that they do not invade the salivary glands.—U. F. Richardson.

Sen, S. K., & Salam, A. (1937). **Experiments on the Transmission of Rinderpest through the Agency of *Stomoxys calcitrans* Linn.**—*Indian J. vet. Sci.* **7.** 219-224. 1 fig., 3 tables. [4 refs.]

A method is described for feeding a number of " biting " flies singly upon bulls infected artificially with rinderpest virus. Each fly is placed in a small cylindrical bottle, the mouth of which is covered by gauze. A number of these bottles (10 in a figure shown) are fixed into a board with perforations of such a size that they are held tightly. These can then be placed, simultaneously, with the gauze covered openings upon the clipped abdominal surface of the animals so that feeding can be permitted for a given period. The jars are then transferred to a healthy bull and the flies are allowed to complete their feed. The normal animal received a total of 1,081 bites during 29 days, remained healthy during a period of six weeks' observation and eventually succumbed to the inoculation of 5 c.c. of virulent rinderpest blood.—E. C. Hulse.

Rastégaieff, E. (1937). *Dermacentor silvarum*, vecteur des hémoparasites du mouton : *Anaplasma ovis* et *Theileria recondita*. [*D.s.*, **Vector of** *A.o.* **and** *Th.r.*]—*Bull. Soc. Path. exot.* **30.** 479-480.

The coincidence of the appearance of *D.s.* on the sheep on a government farm in the Ukraine with an epizootic of *A.o.* and *Th.r.* infection is recorded. Adult ticks, reared in the laboratory, but of a stock originally taken from a naturally infected sheep, transmitted the diseases to a goat. The haemoparasites were present in the peripheral blood 4-5 days after attachment of the ticks.—W. D.

Sen, S. K. (1937). **The Occurrence of Spinose Ear Tick (*Ornithodurus megnini* Dugès) in India.**—*Indian J. vet. Sci.* **7.** 213-218. 2 plates. [7 refs.]

S. reports the finding of *O.m.* in the ears of an Australian horse which was destroyed because it was uncontrollable, evidently as a result of injury to the ear drum and middle ear by the ticks. Other cases are noted in Australian and Indian bred horses, and the tick appears to be wide-spread among army remounts. The conclusion drawn is that *O.m.* was probably introduced into India from South Africa or America, as up to 1936 it was reported to be unknown in Australia. A brief description of the morphology and life-history of the tick is given.—W. D.

PINKERTON, H., & HASS, G. M. (1937). **Spotted Fever. III. The Identification of Dermacentroxenus rickettsi and its Differentiation from Non-Pathogenic Rickettsiae in Ticks.**—*J. exp. Med.* **66.** 729-739. 1 table. [7 refs.]

Dermacentroxenus rickettsi or *Rickettsia rickettsi*, the causal agent of spotted fever, can be distinguished in mammalian tissue by its characteristic morphology and by its intranuclear position in the smooth muscle cells of the blood vessels. The authors now record studies on rickettsial infections of the tick, *Dermacentor variabilis*, fed on normal g. pigs and on g. pigs infected with spotted fever. All the ticks contained coccoid intracellular micro-organisms of an unspecified nature in their ovaries. About 50% of the ticks contained cytoplastic, rickettsia-like organisms in nearly all organs. 75% of ticks fed on animals infected with spotted fever contained intranuclear rickettsia which showed considerable variation in size, and were sometimes as large as bacteria.—U. F. RICHARDSON.

JOHNSON, C. G. (1937). **The Relative Values of Man, Mouse and Domestic Fowl as Experimental Hosts for the Bed-Bug, *Cimex lectularius* L.**—*Proc. zool. Soc. Lond.* **107.** 107-126. [16 refs.] [Copied *verbatim* from *Rev. appl. Ent.* **25.** 217].

Cimex lectularius, L., feeds on the blood of many animals as well as on that of man, and the experiments described were undertaken to determine by the aid of statistical methods whether certain aspects of the biology of the bugs vary when they are reared under similar conditions but on different hosts, in this case, man, mouse and domestic fowl. The last two were chosen as they may possibly serve as hosts in urban districts.

The following is from the author's summary: All immature stages and adults of both sexes of *C. lectularius* feed on man, mouse and domestic fowl. The bug can be bred to the adult stage on any of these hosts, and such adults pair and produce fertile eggs. The rate of development from egg to adult is slightly greater on mouse than on man or fowl. Given equal opportunity for feeding once in every instar, a greater proportion of bugs reach maturity on mouse than on man and the lowest proportion on fowl. Whilst it is shown that the shorter period for development on mouse is correlated with a relatively heavy blood-meal, bugs fed on fowl, which also develop more quickly than on man, do not always take heavier meals. Bugs bred on mouse are heavier and produce more eggs at the first feed than bugs bred on man or fowl. Some unknown factor also appears to contribute to this increased egg-production. Mated adults and second-instar nymphs live longer when starved after a single blood-meal on man than on either mouse or fowl. This is not obvious in the unmated adults until the variation in length of life associated with weight of meal is eliminated; then it is seen that unmated bugs, too, live longest when fed on man. This may be due to the greater proportion of dry material in the blood of man than in that of either mouse or fowl. Bugs fed on man appear to be slightly better fitted for survival after one meal than those fed on fowl. The primary reasons for the differences in the life of bed-bugs living on man, mouse and fowl in nature are more likely to lie in differences in the behaviour of the insects in the presence of those hosts than in the physical effects of the meals.

I. HOBSON, R. P. (1937). **Sheep Blow-Fly Investigations. VI. Toxicity of Stomach Poisons to Sheep Maggots.**—*Ann. appl. Biol.* **24.** 808-814. 5 tables. [3 refs.]

II. MACLEOD, J. (1937). **The Experimental Production of Cutaneous Myiasis of Sheep.**—*Parasitology.* **29.** 526-529. [6 refs.]

I. H. describes (a) a laboratory method for the carrying out of larvicidal tests of stomach poisons, and (b) dipping experiments. The conclusions drawn from (a) were that the arsenites were generally more toxic than the arsenates. The fluorine compounds and the organic poisons gave promising results, even at low concentrations. In (b) the repellent and the larvicidal properties of a series of dips were tested. Those containing arsenic were found to have the most lasting larvicidal action, whilst the arsenic and carbolic dips had the greatest repellent properties.

II. M. reviews the present methods of producing experimental cutaneous myiasis in sheep, for the testing of the repellent and larvicidal properties of dips. He described some of the difficulties which were encountered, and a method which was found to overcome them. With this technique both eggs or first-instar larvae can be used ; the larvae remain confined to the point of attachment, and excessive wetting of the fleece is obviated, a very necessary condition when control measures are being tested.—W. Downing.

PARASITES IN RELATION TO DISEASE [HELMINTHS].

Biggart, J. H. (1937). **Human Infestation with *Fasciola hepatica*.**—*J. Path. Bact.* **44.** 488-489. 2 figs. on 1 plate. [Copied *verbatim* from *Trop. Dis. Bull.* **34.** 803. Signed C. L.]

A woman who never left Scotland and who was in the Springfield Asylum, Cupar, Fife, for acute melancholia died from a retropharyngeal abscess, and in her bile ducts were found about a dozen flukes 2·5 cm. long, 1·3 cm. wide and having " the gross and microscopic characters of *Fasciola hepatica* ". The liver weighed 36 oz., was hard, fibrous, with dilated bile ducts, the glands of the mucosa being often 1 mm. or more long, and the stroma round them infiltrated with eosinophil and plasma cells. In the liver parenchyma was marked biliary cirrhosis, eosinophil filtration and many new bile ducts.

Macy, R. W. (1937). **Further Studies on Prosthogonimiasis.**—Copied *verbatim* from *J. Parasit.* **23.** 566.

Of five turkeys fed cysts of *Prosthogonimus macrorchis*, four developed prosthogonimiasis ; the fifth lost most of its infection due to the change of the oviduct to the resting condition. One turkey was fed twenty dragonfly naiads of the genus *Tetragoneuria* naturally infected with *P. macrorchis*, and twelve days later 236 medium-sized mature specimens of the fluke were recovered from the oviduct. The disease in turkeys was found to be similar to that produced by the same parasite in chickens (Macy, 1934, Minn. Ag: Exper. Station Bul. 98). Naiads of the dragonfly *Gomphus spicatus* Hagen were found to be additional, important, intermediate hosts for *P. macrorchis*.

Stunkard, H. W. (1937). **The Life Cycle of Anoplocephaline Cestodes.**—Copied *verbatim* from *J. Parasit.* **23.** 569.

Studies have been carried on using species of *Cittotaenia* from rabbits and *Moniezia expansa* from sheep. Eggs from feces contain active onchospheres. These larvae remain alive and active after repeated passages through the intestine of the definitive hosts. Treatment of eggs with chemical agents and physical conditions ordinarily encountered in nature did not affect the activity of the onchospheres. Although chemical substances would not induce hatching, mechanical injury of the shell caused emergence of the larvae in a large percentage of cases.

The onchospheres measure approximately 20 microns in diameter. Young tapeworms, 0·3 mm. in length and only slightly farther advanced than the cysticercoid stage, were recovered from naturally infected rabbits. Previous literature on the life history of anoplocephaline cestodes was analyzed to determine the conditions under which infection naturally occurs and thus to discover the characteristics of the intermediate host. Various terrestrial invertebrates, chiefly insects, have been used in attempts to complete the life cycle of *Cittotaenia* and *Moniezia*. In the spring of 1936 cestode eggs were fed to tyroglyphid and oribatid mites and larvae of both these tapeworms were found in the body cavity. Eggs of *M. expansa* were fed to specimens of *Galumna* sp. (*Zetes* sp.) and a series of developmental stages, from the onchosphere to the cysticercoid, have been recovered from the body cavity. In one instance, mites previously exposed to *Moniezia* eggs were fed to a lamb which became infected.

WARDLE, R. A. (1937). **The Influence of *Diphyllobothrium latum* Infestation upon Dogs.**—Copied *verbatim* from *J. Parasit.* **23.** 537.

The influence of infestation with the broad tapeworm, *Diphyllobothrium latum*, upon the serum calcium, plasma phosphorus, haemoglobin content and blood picture of dogs was studied. No significant changes in the calcium and phosphorus levels were observed, the values during the pre-infection and post-infection periods lying between 8·7-10·6 for Ca and 3·8-5·5 for P. The blood picture, from the sixth week onward, was that of a mild anaemia, the red cell count falling from a mean pre-infection value of 4·5 to a post-infection value of 3·39 millions per cubic millimeter, accompanied by occasional poikilocytosis and anisocytosis; no eosinophilia was observed; the haemoglobin content fell from a pre-infection value of 14·28 to a post-infection value of 11·52 grams per 100 ml. of blood. No gastro-intestinal nor neuromuscular disturbances were observed.

TENHAEFF, C., & FERWERDA, S. (1937). De gerschiedenis der echinococcose en haar bestrijding in Friesland in het tijdvak 1916-1937. [**Control of Echinococcosis in Friesland 1916-1937**].—*Tijdschr. Diergeneesk.* **64.** 678-681.

The fact that echinococcosis in man was prevalent in the Province of Friesland was noted in 1916 by SNAPPER, whose discovery led to a systematic investigation by the authors on the frequency of the worm in the dog and in the other domestic animals. They issued their report in 1919, and the measures advocated by them, brought into force by the Meat Inspection Act, 1919, resulted in a considerable reduction in the percentage of infection, in man as well as in animals.

—C. BUBBERMAN (SCHIEDAM).

I. KOMIS, A. (1936). Le liquide des kystes hydatiques comme antigène après fermentation. [**An Antigen for the Intradermal Test for Echinococcosis**]. —*3rd int. Congr. comp. Path. 1936.* **2.** 192-194. [In French].

II. COUDOUNIS, A., & POLYDORIDÈS, J. (1936). Sur les constituants du liquide des kystes hydatiques. [**Constituents of Hydatid Cyst Fluid**].—*Ibid.* 195-202. 3 tables. [In French].

III. URBAIN, A. (1936). La réaction de fixation appliquée au diagnostic de l'échinococcose animale. [**Complement-Fixation Test for Echinococcosis in Animals**].—*Ibid.* 388-891. [5 refs.] [In French].

I. K. submitted the fluid of hydatid cysts to a fermentation process for the production of bacterial antigens, *i.e.*, the liquid is sown with *Saccharomyces ellipsoides* and incubated at 28°C.; in a few days fermentation is complete and the fluid is then passed, not under pressure, through a Chamberland No. 2 filter.

The fluid was easily fermented as it contains albumin and especially sugar. The finished product, when injected intradermally in doses of 1 c.c., produced a reaction which might be a little less intense than that caused by non-fermented material but was more extensive (4-5 cm. in diameter), appeared earlier and disappeared later. It failed to produce anaphylactic phenomena in laboratory animals and was, therefore, not dangerous. When used as an antigen in the complement-fixation test the results were not very encouraging.

II. The appearance of hydatid fluid, its reaction, its albumin, sugar, urea and chlorine content, its alkaline reserve and the presence of uric acid which was found in it, are discussed. The results suggest that the different organs of the body in which the cyst is situated may well affect, to a certain degree, some of these constituents and thus, possibly, the cyst fluid. The authors point out that it is not always easy to find parasite elements in hydatid fluid and conclude that the examination of cyst fluid obtained by exploratory puncture is not always sufficient for diagnostic purposes.

III. When hydatid fluid from sheep is used as the antigen, the c.f. test of Calmette and Massol can be usefully employed for the diagnosis of echinococcosis in animals, including wild animals in captivity. The intradermal test, which gives such trustworthy results in human beings, does not appear to be reliable in animals.

—G. Williamson.

Baker, D. W. (1937). **Parasitic Gastro-Enteritis of Calves.**—*Cornell Vet.* **27.** 381-394. 3 figs., 2 tables. [12 refs.]

Despite good feeding calves can be so heavily infested with gastro-intestinal nematodes that they develop chronic diarrhoea and finally die from emaciation. In one of the cases described six thousand *Ostertagia ostertagi* were found in the abomasum, nineteen thousand *Cooperia ancophera* in the small intestine and 78 *Trichuris* in the large intestine. Six out of 15 calves died in one outbreak and 2 out of 10 in another. Diagnosis is based on clinical symptoms, epidemiological findings and P.M. examinations. The value of any treatment adopted can be assessed by egg counts of the faeces. A parasite-free calf in good condition was kept on heavily infested ground and well fed. It died a month later, when it yielded 28,200 *Ostertagia* from the abomasum and 17,700 *Cooperia* from the intestine.—P. S. Watts.

Penso, G. (1937). Reperto di *Ascaridia perspicillum* (Rud.) vivo in uovo di gallina. [*Ascaris perspicillum* **in a Hen's Egg**].—*Arch. ital. Sci. med. colon.* **18.** 100-101. [Copied *verbatim* from *Helminth. Abstr.* **6.** 5-6. Signed P. A. C.]

Penso records the presence of a male *Ascaridia perspicillum* living within a hen's egg. He suggests that it may have migrated from the intestine through the rectum and cloaca and ascended into the oviduct where it has become incorporated into the substance of the egg before the shell was laid on.

Toryu, Y. (1935). **Contributions to the Physiology of the Ascaris, III. Survival and Glycogen Content of the Ascaris** *Ascaris megalocephala* **Cloq., in Presence and Absence of Oxygen.**—*Sci. Rep. Tôhoku Univ.* **10.** 361-375. [Copied *verbatim* from *Helminth. Abstr.* **5.** 204. Signed R. H. H.]

Toryu has carried out experiments *in vitro* with *Ascaris megalocephala* which show that the presence of carbon dioxide is favourable to the period of survival of the worm, whereas the presence of oxygen is unfavourable. Under anaerobic conditions, glycogen consumption is almost entirely confined to the first half of the period of survival, whilst under aerobic conditions it continues throughout

the entire period. During starvation the glycogen consumed is that stored in muscle cells and developing young reproductive cells, but not that stored in the adult reproductive cells. The presence of valeric, lactic and propionic acids in the liquid around the worms, suggests that the decomposition of glycogen takes place by a fermentation process.

I. Landsberg, J. W., & Foster, A. O. (1937). **The White Cell Picture in Hookworm Disease of Dogs.**—*Amer. J. Hyg.* **25.** 141-149. 3 tables. [8 refs.]

II. Foster, A. O., & Cort, W. W. (1937). **The Stability of the Cat and Dog Strains of** *Ancylostoma caninum.*—*J. Parasit.* **23.** 83-93. 1 table, 1 chart. [12 refs.]

I. Examinations, quantitative and qualitative, were made of the white blood cells of seven dogs infected *per os* with *Ancylostoma caninum* and of two infected through the skin. Marked leucocytosis did not follow infestation, nor was its degree influenced by the path of entry. High counts were due to an increase of neutrophiles. Eosinophilia did not always follow either method of infection. There was no appreciable change in the number of basophiles and the monocyte count remained constant. Lymphocytopenia, which in some cases accompanied the increase in neutrophiles and eosinophiles, was apparently not the result of infection.

II. Experiments were undertaken to verify and extend the work done by Scott (1929. *Amer. J. Hyg.* **10.** 125-139). A cat strain of *A.c.* was passed for two generations through dogs and then for seven generations through cats. It was found that the first generation recovered from a dog had taken on the infectivity of a dog strain, and that its succeeding generations retained high infectivity to dogs. When, however, it was passed through cats it was only slightly infective to them up to the fifth generation, but from that to the seventh, *i.e.*, as far as the investigation was pursued, it appeared partially to regain its infectivity to cats. It was concluded that the dog strain was more stable than the cat strain and that the latter had probably evolved from the former.—G. Williamson.

I. Steward, J. S. (1937). **The Occurrence of** *Onchocerca gutterosa* **Neumann in Cattle in England, with an Account of its Life History and Development in** *Simulium ornatum* **Mg.**—*Parasitology.* **29.** 212-219. 10 figs. on 1 plate, 2 tables. [8 refs.]

II. Strong, R. P. (1937). **Onchocerciasis in Central America and Africa.**—*Trans. R. Soc. trop. Med. Hyg.* **30.** 487-506. 2 tables. [6 refs.]

I. Adult worms have been demonstrated in cattle in the connective tissue of the ligamentum nuchae and around the spleen, while microfilariae have been encountered in the skin. Evidence is given to show that these are probably *O.g.* All the stages of development have been observed in flies of the genus *Simulium*, especially in *S.o.* It has not been possible to demonstrate the parasites in flies of the genus *Culicoides*.

II. A species of *Onchocerca*, resembling *O. reticulata* or *O. gutterosa* was found in the ligamentum nuchae of buffalo and antelope. In the eland nodules were encountered which contained *Onchocerca* apparently identical with *O. volvulus* of man. Both the nodular form and the involvement of the ligamentum nuchae are common in cattle in Northern Rhodesia, where transmission is thought to be due to *Culicoides* rather than *Simulium*. It is suggested that a species of antelope is the reservoir from which man and cattle are infected with onchocerciasis. —P. S. Watts.

Smythe, R. H. (1937). **The Clinical Aspects and Treatment of "Hoose" (Parasitic) and Allied Conditions in Cattle.**—*Vet. Rec.* **49.** 1221-1232. [4 refs.]

The effects of breed, nutrition, overcrowding, age and climate on the resistance of cattle to infection are noted and the symptoms, diagnosis, prognosis and treatment discussed. A discussion mainly confined to treatment follows.—P. S. Watts.

Shaw, J. N. (1937). **Studies on the Effect of a Diet Deficient in Vitamin A on Lungworm Infestation in Sheep.**—*N. Amer. Vet.* **18.** No. 10. 25-27. [5 refs.]

Typical symptoms of vitamin A-deficiency were produced in six wethers on a deficient diet. All developed urinary calculi, composed mostly of silica. Two of the wethers experimentally fed infective lungworm larvae did not show increased susceptibility to lungworm infestation.—N. J. Scorgie.

Cameron, H. S., & Stewart, M. A. (1937). **Studies on the Course of Trichostrongyle Infestation in Sheep.**—Copied *verbatim* from *J. Parasit.* **23.** 569-570.

Lambs, weaned from ewes at 24 hours of age, were reared on bovine milk and maintained under quarantine conditions in quarters with concrete floors that were swept daily and disinfected weekly. They were free from trichostrongyles as determined by fecal examinations. At various ages ranging from 1 to 4 weeks they were infested orally with a known number of infective larvae in gelatin capsules. Non-infested lambs mingled with the infested lambs as a control on reinfestation. The larvae consisted chiefly of *Ostertagia circumcincta* and *Trichostrongylus colubriformis*. A few *Oesophagostomum* sp. were present. Fecal samples were taken daily from infested lambs and controls. Egg counts were made, first by flotation and then, when justified by numbers, by a modified Caldwell technique. Results indicated that lambs one week old were susceptible to trichostrongyles and that the intrinsic incubation period of the parasite including the passage of the eggs along the alimentary tract was approximately 20 days. The degree of daily fluctuation in egg counts was great, indicating the necessity of taking this factor into consideration when estimating the efficiency of an anthelmintic by an egg count. The curve, in general, represented a series of peaks, the apices of which gradually decreased. In all instances negative phases occurred followed by sudden rises and then equally sudden drops. The length of some of the negative phases made it difficult to determine the duration of the patency. The shortest duration encountered was 120 days followed by 77 days of negative fecal examinations. The variation in the duration of patency is shown in the fact that another animal is still passing eggs 200 days after infestation. Controls were negative at all times.

Stewart, M. A., & Douglas, J. R. (1937). **Studies on the Bionomics and Seasonal Incidence of *Trichostrongylus axei* (Cobbold).**—Copied *verbatim* from *J. Parasit.* **23.** 569.

Eggs of *Trichostrongylus axei* maintained at a constant temperature of 100 degrees F. hatched and viable larvae were observed up to 96 hours after the eggs were exposed to this temperature. Eggs maintained at a constant temperature of 22 degrees F. hatched and viable larvae were again observed up to 96 hours. *T. axei* eggs submerged in water to a depth of 15 mm. and kept at room temperature remain viable for 20 days. Eggs kept in thoroughly dry sheep feces remain viable for more than 193 days at room temperature. Non-infective *T. axei* larvae are killed when dried for 30 minutes at 80 degrees F. Infective larvae immersed in

tap water remain alive 408 hours at 100 degrees F. : they remain viable 192 hours in moist sheep feces at this temperature ; in dry feces they die within 48 hours. Infective larvae can successfully withstand submergence in water at room temperature for 231 days but die in 16 days when dried at the same temperature. Larvae of this stage live for more than 137 days in moist soil at room temperature. Infective larvae manifest no phototrophic responses. These data are used in an attempt to explain the fall and winter peaks of *T. axei* infestations in sheep on irrigated pastures in California.

LEIPER, J. W. G. (1937). **Natural Helminthiasis of the Goat Involving Infection with Trichostrongylus retortaeformis of the Rabbit.**—*Vet. Rec.* **49.** 1411-1412.

Three hand-reared goats were grazed on some rough land on which goats had previously been kept and which was heavily contaminated with rabbit faeces. One year later two died and yielded fifteen thousand and sixteen thousand worms respectively, including a number of *Tr. retortaeformis*, while the third was removed and well fed indoors. The latter, when killed two months later, had only five thousand worms in the alimentary canal. A kid was then given eight thousand infective larvae of *Tr.r.* and 302 adults were recovered when it was slaughtered 21 days later.—P. S. WATTS.

VELU, H., & ZOTTNER, G. (1937). Chéloides géantes consécutives à l'habronémose cutanée chez le baudet. [**Habronemiasis in Donkeys in Morocco**].—*Bull. Soc. Path. exot.* **30.** 490-494. 2 figs. [2 refs.] [Also appeared in *Maroc méd.* **17.** 298-300].

The persistence throughout the year of summer sores in donkeys in Morocco, and their recurrence after excision, led to the study of their histopathology.

It was found that although in certain parts the lesion closely resembled a pure fibroma, it nevertheless distinctly differed from such a tumour in that its line of demarcation from surrounding healthy tissue was very ill-defined, it formed no peduncle, the blood vessels at its base were distributed in a diffuse network, and a super-abundance of fibrocytes, an interstitial fluid and bundles of collagenous fibres were observed. On the other hand, its situation (it was found to be invariably confined to the skin), its persistence, its recurrence after excision, and its histology showed that it was more in the nature of a keloid.

It is suggested that a histo-chemical study might explain the relationship, which has been noticed by others, between the severity of the cutaneous lesions and the degree of intestinal parasitism.—G. WILLIAMSON.

NOLF, L. O., & EDNEY, J. M. (1937). **The Larval Production of *Trichinella spiralis* in Rats given Graduated Numbers of Larvae.**—Copied *verbatim* from *J. Parasit.* **23.** 567.

Rats were given larvae of *Trichinella spiralis per os* in graded doses. A total of 196 rats survived the six weeks period allowed for the infestations to develop. The rats were then killed and the larvae recovered by digestion of the carcasses. Counts were made of the larvae both directly and by dilution methods. The average infestation recovered from a group of rats receiving the same dose was determined by the equation $\sqrt{\frac{\overline{EX^2}}{N}}$ The results obtained are here given: *larvae fed/average infestation* ; 20/4809 ; 40/4472 ; 80/6808 ; 160/12385 ; 320/20321 ; 640/83261 ; 1280/140515 ; 2250/151743 ; 4500/393041 ; 9000/694575.

Lachowicz, J. P. (1937). Badania doświadczalne nad stosowaniem odczynu Biernackiego (szybkośc opadania krwinek) przy włośnicy. [**Biernacki's Test for Trichinosis**].—*Przegl. wet.* **52.** 437-456. 15 tables. [8 refs.] [German summary].

Biernacki's test is merely an observation of the R.B.C. sedimentation rate in infected animals. Seven days after infection of rabbits with 100-300 trichinella the sedimentation rate showed an increase which lasted for about 14 days, whilst in rabbits given 500-5,000 specimens of the worm the high sedimentation rate was observed for 30 days.—A. Szwabowicz (Lwów).

I. Riley, W. A., & Scheifley, C. H. (1934). **Trichinosis of Man a Common Infection.**—*J. Amer. med. Ass.* **102.** 1217-1218. 1 table. [4 refs.]

II. McNaught, J. B., & Anderson, E. V. (1936). **The Incidence of Trichinosis in San Francisco.**—*Ibid.* **107.** 1446-1448. 3 figs., 2 tables. [8 refs.]

III. Cameron, T. W. M. (1937). **Trichinosis—a Public Health Problem.**—*Vet. J.* **93.** 439-441.

IV. van Someren, V. D. (1937). **The Occurrence of Subclinical Trichinosis in Britain. Results from 200 London Necropsies.**—*Brit. med. J.* December 11th. 1162-1165. [17 refs.]

V. Anon. (1937). **Trichinosis.**—*Ibid.* 1178. [1 ref.]

I. From P.M. examinations of the diaphragms of human beings, the following cases of trichinosis were reported :- Glazier, 1881—1·8% in 290 persons ; Williams, 1901—5·3% in 505 persons ; Osler, 1898—0·6% in 1,000 persons ; Simonds, 1910—2% in 100 persons ; Whelply, 1891—5% in 20 persons, and Thoenburg, 1894—14·3% in 21 persons. The authors found trichina larvae in the diaphragms of 20 out of 117 cadavers (17·9%).

II. The authors found trichinae in the diaphragms of 48 out of 200 (24%) human beings examined P.M. at San Francisco.

III. A brief historical account of *Trichinella* and its present importance in various countries.

IV. Out of the 200 diaphragms examined only two cases of trichinosis were found and the infection was slight, but evidently endemic. In Great Britain precautions in pig-rearing, and hygienic domestic conditions, minimize the risk of endemic infection. Imported bacon, admitted without an official certificate or microscopical examination, is a possible source of infection. More stringent regulations are being imposed.

V. A general article on the character and incidence of the disease and its control. [All the above records relate to persons dying from various causes and in whom trichinosis had not been suspected during life].—J. E.

I & II. Hall, M. C., & Collins, B. J. (1937). **Studies on Trichinosis. I. The Incidence of Trichinosis as Indicated by Post-Mortem Examination of 300 Diaphragms. II. Some Correlations and Implications in Connection with the Incidence of Trichinae Found in 300 Diaphragms.**—*Publ. Hlth Rep. Wash.* **52.** 468-490 and 512-527. 5 tables [Numerous refs.]

III. Hall, M. C. (1937). **Studies on Trichinosis. III. The Complex Clinical Picture of Trichinosis, and the Diagnosis of the Disease.**—*Ibid.* 539-551.

I. The diaphragms of 300 hospital patients dead from causes other than trichinosis, and taken from all parts of the U.S.A., were examined for trichinosis and specimens were found in 41 of the cadavers. From other similar reports an average infection incidence of 12·5% of 1,778 cases was determined. The technique

for examining tissue is described. Live trichinae predominate in slight, and dead in heavy infestations when death is due to other causes.

II. The incidence relative to various population groups, age, etc., is discussed. The examination of 1 g. of diaphragm muscle in a press preparation is preferred to section examination.

III. A discussion of the clinical aspect of human trichinosis.—F. H. Manley.

I. Yamamoto, K. (1936). **Histo-Pathological Findings of the Uterus, the Placenta, and the Fetus of Dogs Infected with Dirofilaria immitis. (I. Report.)**—*Trans. Soc. path. Jap.* **26.** 690-694. 4 tables. [In English].

II. Ohashi, M. (1936). **A Patho-Histological Research on the Eyes of Dogs having Dirofilaria immitis.**—*Ibid.* 694-695. [In English].

I. Y. examined histologically the uterus of non-pregnant and of pregnant dogs, infected with filariasis, for the presence of larvae. In the non-gravid uterus larvae were seen escaping from blood vessels, but none were seen in the glands of the mucosa. At oestrus the haemorrhage carried larvae into the cavity of the uterus and into the glands of the mucosa. From sections made of the maternal and foetal placentas, it appeared that the larvae did not cross the placental barrier into the foetal membrane.

II. O. observed that the filaria larvae freely invaded the capillaries of all parts of the eye, conjunctiva and eyelids and that they sometimes escaped from the capillaries into the tissues and humours of the eye, including the vitreous humour and conjunctival secretion.—J. E.

Arnold, J. G., Jr., & Duggan, T. L. (1937). **Immunological Studies with *Dirofilaria immitis*.**—Copied *verbatim* from *J. Parasit.* **23.** 561.

The present study was undertaken to determine whether any immunization could be effected in dogs against the heart worm, *Dirofilaria immitis*. Sterile, saline suspensions of the macerated parasites were injected weekly into rabbits for three consecutive weeks. Six weeks after the last injection microfilaria were subjected to the sensitized serum with marked lethal results. Standardization experiments are now being undertaken.

IMMUNITY.

Cavalli, G. (1937). Ricerche comparative sulle reazioni cutanee con l'"esotubercolina" Finzi e con la tubercolina di Koch. [**Skin Tests with Exotuberculin and Old Tuberculin**].—*Profilassi.* **10.** 61-64. [9 refs.] [French summary].

The diagnostic value of exotuberculin was tested on a series of human patients, some of whom were known to be suffering from TB. C. concludes that exotuberculin, given intradermally, is a better diagnostic agent than old tuberculin, but that it is not of similar value for cutaneous reactions.—J. A. Nicholson.

d'Alessandro, N. V. (1936). Valor práctico de la reacción de fijacion del complemento en el diagnóstico de la tuberculosis de los bovines. [**The Complement-Fixation Test for Bovine Tuberculosis**].—*Rev. Med. vet., B. Aires.*—**18.** 808-814. 1 table. [1 ref.]

Comparisons were made between the tuberculin and c.-f. test on 260 cattle, 170 of which were negative to both and 68 positive to both. Twenty were positive to the c.-f. test and negative to the tuberculin test, and two *vice versa*. The value of the c.-f. test in bovine TB. is discussed.—S. Torres.

Acevedo, R. A. (1937). **Complement-Fixation Reaction in Hemorrhagic Septicemia.**—*Philipp. J. anim. Indust.* **4.** 189-204. 8 tables. [11 refs.]

A. studied the c.f.t. for H.S., but found that under conditions prevailing in the Philippines the antigen prepared by accepted methods was unsatisfactory ; this he suspected to be due to envelope formation by the organism when grown at 37°C., as Schütze had found in the case of *Pasteurella pestis* [(1932). *Brit. J. exp. Path.* **13.** 284-298]. Cultivation was accordingly done at 18°-20°C. for 24 hours and an antigen was prepared which proved satisfactory. The technique is minutely described.—E. E. Jelbart.

Sjollema, P. (1937). De agglutinatie-reactie bij de abortus Bang-infectie van het rundvee. [**The Agglutination Test for Bovine Brucellosis**].—*Tijdschr. Diergeneesk.* **64.** 1431-1439. 3 tables. [19 refs.] [English, French and German summaries].

S. pleads for the adoption of international standards for the tube agglutination test for contagious abortion, based on the instructions given by the United States Live Stock Sanitary Association, and on the Donham and Fitch method, for the rapid test. To ensure the necessary uniformity the test should be executed only by experts in central laboratories.—C. Bubberman (Schiedam).

Boivin, A. (1936). Sur le comportement comparé des endotoxines et des exotoxines vis-à-vis de l'acide trichloracétique. [**The Comparative Behaviour of Endo- and Exotoxins in the Presence of Trichloracetic Acid**].—*C. R. Acad. Sci., Paris.* **203.** 284-286. [4 refs.]

Trichloracetic acid was added to diphtheria anatoxin until the pH fell to 4·0 when a fine precipitate appeared. This was easily thrown down by centrifugation and was soluble in sodium phosphate solution of pH 8·0. B. suggests that this may be a purer anatoxin than that obtained by precipitation with hydrochloric or acetic acid.—A. Wilson Taylor.

Meyer, K., & Pic, A. (1937). Des différences dans la thermorésistance de diverses catégories d'anticorps. [**Heat Resistance of Antibodies**].—*Ann. Inst. Pasteur.* **59.** 282-292. 5 tables. [12 refs.]

This paper reveals that there are differences in the temperatures at which anti-lipoid and antipolysaccharide antibodies in tuberculous sera are inactivated. In the sera of some species of animals the former are more resistant than the latter, whereas in other species the reverse applies. Even in different sera from the same species considerable variations in the inactivating temperatures of each type of antibody are found to occur.—Gwilym O. Davies.

I. Hooker, S. B. (1937). **The Nature of Antibodies.**—*J. Immunol.* **33.** 57-74.

II. Ingalls, Mabel S. (1937). **A Contribution to the Nature and Origin of Natural Agglutinins.**—*Ibid.* 123-148. 11 tables. [Numerous refs.]

I. H. gives a résumé of the views now generally held regarding the nature of antibodies and the mechanism of their formation. He discusses the importance of surface or adsorption forces in relation to the antigen-antibody reaction, and considers the varieties, the location and the complexity of the combining groups in antigen and antibody. The need for using pure antigen in the study of many of the problems of immuno-chemistry is stressed. Attention is also drawn to the fact that animals which are immunized possess individual responsiveness, *e.g.*, sometimes only one of a dozen rabbits will furnish a quality of antibody suitable

to a given purpose, prolonged immunization often being necessary in order to produce antibodies to minor determinants.

II. The findings of certain workers give support to the view that latent infection is the cause of natural antibody production, but as there are many instances in which no correlation between antigen and antibody has been reported, the author has endeavoured to discover a correlation between a natural agglutinin present in adult normal rabbit serum, which acts on a pathogenic organism with which the host has not been in contact, and the presence of a non-pathogenic organism in the intestine of the animal. Results show that there is not necessarily a correspondence between an organism isolated from the intestines of a certain rabbit and the reaction of the serum from the same animal, but in many cases the serum of normal adult rabbits does contain agglutinins active against non-pathogenic organisms commonly found in the intestines of the animals. It was found that a good agglutinative titre for all the organisms usually agglutinated by adult serum had developed by the time the young were three months of age.

The author considers that until more work has been carried out in identifying the specific groups of many bacteria, chemically or in some other way, the discovery of serologically common fractions in various pathogenic bacteria, in red cells, etc., and in the common saprophytic inhabitants of the body, must remain largely a matter of chance.—H. V. Hughes.

Sédallian, P., Jourdan, J., & Clavel, J. (1937). De l'immunité passive conférée à des animaux anciennement immunisés activement. [**Passive Immunity Conferred on Animals Formerly Actively Immunized**].—*C. R. Soc. Biol. Paris.* **125.** 676-678. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 808. Signed J. C. Cruickshank].

Normal rabbits were extensively bled and a similar amount of blood from actively immunized rabbits inoculated intravenously. Titration of the receptor's circulating antitoxin 10-15 minutes later gave a figure about 1/10 of that to be expected from calculating that that total number of units injected had been diluted in the receptor's blood. When, however, the receptor was a rabbit which had been actively immunized some time previously, the titre now being low, the antitoxin content after transfusion closely approximated to the calculated value. The titres in each case dropped rapidly in the following days, even where the donors had been rabbits in the course of active immunization with rising antitoxin content.

I. Landsteiner, K. (1932). **Note on the Group Specific Substance of Horse Saliva.**—*Science.* **76.** 351-352. [8 refs.]

II. Landsteiner, K. (1936). **On the Group Specific A Substance in Horse Saliva. II.**—*J. exp. Med.* **63.** 185-190. [Numerous refs.]

I. Horse saliva contains a substance which reacts with group specific immune sera prepared against the A group of human blood.

II. L. gives a detailed description of the chemical purification of the A substance referred to in I. Its chemical properties indicate that it is of a polysaccharide nature. In the tests for inhibition of haemolysis and inhibition of isoagglutination the A substance was found to be highly active.—N. J. Scorgie.

DISEASES, GENERAL.

Antonio, C. (1937). Vaccinazione anticarbonchiosa Pasteur e vaiolo caprino. [**Effect of Anti-Anthrax Vaccination on Goat Pox**].—*Clin. vet., Milano.* **60.** 222-226. [9 refs.] [English and French summaries].

On several occasions as many as 85% of goats vaccinated against anthrax developed goat pox 2-3 days later. A. considers that this cannot be coincidence and that it might be due either to contamination of the vaccine, the virus and bacteria being able to live in symbiosis or to the fact that following vaccination a negative phase in the resistance of animal develops which enables the virus to become active [the virus being presumably considered to be already present in or on the goats, but unable to produce infection].—J. A. NICHOLSON.

PLATE. (1937). Die Bekämpfung der Abortus-Bang-Infektion, der Tuberkulose und des Gelben Galtes im Plane der Massnahmen der Rohmilchversorgung. Die Rohmilchversorgung der Stadt Bremen. [**The Control of Contagious Abortion, Tuberculosis and Mastitis as Part of the System of Handling Raw Milk at Bremen, Germany**].—*Z. InfektKr. Haustiere.* **51.** 287-302. 1 fig., 8 tables. [6 refs.]

In the province of Bremen, most of the milk is consumed in a raw state, and the cows supplying such milk are periodically tested for diseases which might be injurious to public health. In a survey undertaken to ascertain the incidence of *Brucella abortus* infection in milk herds, 12·9% of 2,038 were found to be infected, the majority of herds containing more than ten cows. Cows whose blood shows agglutinins to a titre of 1 : 20 or over are eliminated, and by this measure a considerable reduction in the incidence of infection has been made since 1934. TB. is controlled by examining the bulk milk and by the elimination of animals with infected udders. Mastitis is not a disease of serious consequence, but periodic tests are made on the milk for the presence of streptococci and abnormal leucocyte content. The results of a clean milk supply are reflected in the satisfactory public health statistics.—S. J. EDWARDS.

GOULD, G. N. (1937). **Some Observations on the Feeding and Management of a Dairy Herd.**—*Vet. Rec.* **49.** 1611-1615.

The conventional method of computing rations for dairy cattle is described, with stress on the importance of an adequate mineral supply in the diet. Practical aspects in the eradication of tuberculosis, contagious abortion and Johne's disease are discussed. G. considers that these diseases can be most easily eliminated from a herd when it is possible to exclude the cattle from contaminated pastures for a fairly lengthy period. He found the bromcresol purple test valuable in the diagnosis of streptococcal mastitis, and was able to control the disease in heavily infected herds by systematic tests and treatment of infected quarters with " entozon ". —N. J. SCORGIE.

ANON. (1937). Uebersicht über die gegenwärtig praktisch bedeutungsvollen Erbkrankheiten bei den Haustierarten, die vom Tierzuchtgesetz erfasst werden. [**Hereditary Animal Diseases Mentioned in the Animal Breeding Law, Germany**].—*Dtsch. Tierärztebl.* **4.** 236-237.

A list of 13 conditions in equines, 6 in bovines, 7 in pigs, 3 in sheep and 4 in goats is given. [In Britain many of those specified are not considered hereditary]. The futility of attempting to select suitable breeding stock merely by an inspection of the proposed mates is emphasized, and also the necessity of knowing the ancestral history of both parents as well as the environmental conditions under which the progeny must live. The value of stud-book records is acknowledged, but it is considered that the local veterinary practitioner is, or should be, an important source of reliable information, and that officials responsible for the country's breeding stock should collaborate closely with him.—G. WILLIAMSON.

HORNBY, H. E. (1937). **The Control of Animal Diseases in Relation to Overstocking and Soil Erosion.**—*Emp. J. exp. Agric.* **5.** 143-154. [10 refs.]

The Director of Veterinary Services of Tanganyika accepts the challenge implied in the hesitancy of some Colonial Governments to support veterinary activities; the belief that successful control of animal diseases leads to overstocking and erosion constitutes that challenge.

It is pointed out :– (1) that overstocking does not necessarily lead to erosion; (2) that in the world generally, injudicious cultivation is chiefly to blame; (3) that in any case the native prefers to keep his cattle in arid areas, because although they are constantly on the verge of starvation and are dwarfed thereby, climatic factors discourage the development of secondary hosts and extra-host parasites. Such are ticks and tsetse flies, piroplasms, rickettsia, trypanosomes and nematodes. The density of stock in Tanganyika is in inverse ratio to their health.

The primary cause of overstocking is the natives' wish to accumulate wealth, abetted by ignorance and indifference to the future. Overstocking is defined by H. as " the maintenance of animals on a piece of land to the detriment of its carrying capacity." This might well be adopted as a standard definition.—R. N. FIENNES.

I. LOVELL, R. (1937). **Venereal Diseases of Animals.**—*Brit. J. vener. Dis.* **13.** 192-203. [Numerous refs.]

II. LESTOQUARD, F. (1937). Les néoplasmes vénériens contagieux et les tumeurs de la base du coeur chez le chien. [**Venereal Neoplasms and Tumours at the Base of the Heart in Dogs**].—*Rev. Méd. vét., Toulouse.* **89.** 480-484. [1 ref.]

I. Several diseases of animals which are naturally transmitted either wholly or in part by coitus are briefly described. Brucella infection in cattle and pigs, rabbit syphilis, dourine, trichomoniasis in cattle, contagious venereal tumours in dogs, and coital exanthema in cattle, horses and sheep are the conditions dealt with. The distribution and incidence of the diseases, symptoms, diagnosis and control are mentioned.

II. This paper is a short summary of the views put forward by JACKSON [(1936). *Onderstepoort vet. J.* **6.** 3-460]. The contagious venereal sarcoma of dogs has defied classification, having been classed both as carcinoma and sarcoma. The tumours are similar in structure to the heart base tumour and JACKSON suggests that the latter arises from undifferentiated nerve cells of the sympathetic system (sympathogonia), groups of which can be found between the aorta and pulmonary artery in the foetus. Both classes of tumour may thus be neuroblastomas. —E. G. WHITE.

MARTINAGLIA, G. (1937). **Some Considerations Regarding the Health of Wild Animals in Captivity.**—*S. Afr. J. Sci.* **33.** 833-844. 3 figs. [Num. refs.]

In the course of his duties as veterinary surgeon to the Johannesburg Zoological Gardens, M. came across a number of interesting conditions in wild animals in captivity. Amongst the wild antelopes, infection with *Actinomyces necrophorus* was frequent, chiefly affecting the oral cavity, tongue, cheeks and nasopharynx. Most cases terminated fatally in a broncho-pneumonia. Lesions were frequently seen in the stomach. A case of tuberculosis in a giraffe was found to be due to the human type of *Mycobacterium tuberculosis*. Outbreaks of botulism in geese and of *Salmonella typhi-murium* infection in canaries were encountered. A new *Babesia* in the blood of the sable antelope was described. Distemper was encountered in silver jackals and a disease resembling Stuttgart disease occurred in black backed jackals. M. stresses the importance of sanitation and the avoidance of nutritional disturbances in the animals in zoological gardens.—E. M. ROBINSON.

ZANDER, E. (1937). **Changes in Blood Vessels (Capillary Fragility) with Inflammation.**—*J. exp. Med.* **66.** 637-651. 9 figs., 1 table. [15 refs.]

Using a glass tube 8 mm. in diameter as a suction tube, it was found that a partial vacuum of –70 mm. Hg applied to the skin of rabbits for an average time of eight minutes caused intracutaneous haemorrhage over the whole area subjected to suction. The injection of irritants such as turpentine, or preparations of selected suspensions of dead pathogenic bacteria, increased the time taken for the production of haemorrhage to 30-120 minutes. This period of increased resistance was followed 12-24 hours later by a period of diminished resistance when capillary bleeding could be caused in 1-4 minutes.

Histological examination of the lesion did not determine whether the bleeding was due to capillary rupture or diapedesis.—H. H. HOLMAN.

HOLMBOE, F. V. (1937). Noen iakttagelser vedrørende sølvrevhvalper. [**Diseases of Silver Fox Cubs**].—*Norsk VetTidsskr.* **49.** 682-692. 1 text fig., 2 figs. on 1 plate.

Short accounts of some ailments in silver fox cubs as experienced in practice are here recorded, including calcium borogluconate therapy in overdosage with tetrachlorethylene, poisoning following bathing in a 2% solution of creolin, vaccination against paratyphoid, hereditary chondrodystrophic or achondroplastic malformation of the skeleton, especially of the limbs, and hereditary absence of the iris in a fox family.

He describes in particular a condition in the cubs known among the practical fox farmers as " sore paws ". The symptoms of this condition may be evident at birth, but usually appear a few days later. The whole litter may become affected. The cubs are weak and most of them die. The main visible signs are small, circumscribed, cutaneous, haemorrhagic lesions, localized in the pads of the paws and around the coronary border of the claws, on the snout, around the anus, on the abdomen and elsewhere. The lesions are often more obvious on the inner side of the skin after flaying. They may also occur in the muscles. As to the aetiology, vitamin C- or B_2-deficiencies or *Bacterium coli* infections were suspected, but not proved. Mammary oedema and mastitis in lactating vixens are also described. —GUSTAV NAERLAND (OSLO).

CHRISTENSON, I. (1937). En solbränd ko. [**Sunburn in a Cow**].—*Svensk VetTidskr.* **42.** 305-307. 2 figs.

C. here records three cases (one very bad) of sunburn of the white skin in piebald cows grazing on the same pasture, which was deficient in calcium and phosphorus. The bad case was seen in a cow about a week after it had been turned out on to the pasture. All white patches of the skin necrosed, so that the animal had to be destroyed. It is suggested that a special idiosyncrasy, possibly connected with mineral deficiency, may have rendered these three animals particularly susceptible to the sun's rays. [These cases appear to be photosensitization, but nothing is said about plants which may have been concerned in its causation].—GUSTAV NAERLAND (OSLO).

MACGREGOR, A. D. (1937). **Non-Sweating, Heat-Stroke and Kumri and their Inter-Relationship in Horses in India.**—pp. 123. 36 figs., 1 table, 1 chart. [Numerous refs.] Calcutta: Bengal Veterinary College. [8vo].

It is argued that anhydrosis, heat-stroke, " kumri " and, possibly, lichen tropicus are closely related. The clinical characteristics of each condition are described. Dark-coated horses imported to the tropics are those usually affected.

MacG. considers that these dark-coated horses become non-sweaters because they absorb heat more readily than those with coats of lighter colour and reflect light rays less readily.

A hypothyroid-adrenalism complex is said to exist in dark-coated animals so that control of peripheral vascularity is impaired. He considers that in imported horses the sweating mechanism, being unused to sudden demands, is quickly fatigued when subjected to excessive activity, and that vascular constrictions of the larger blood vessels are less responsive and more quickly fatigued than those of indigenous stock. Peripheral dilatation is said to be followed by lower blood pressure and anoxaemia, resulting in a tendency to acidosis, a loss of alkaline reserve, and sodium deficiency. Lack of sodium is said to cause a cessation of water excretion or anhydrosis, as well as a shortage of tissue-stored water, so that potassium, although present in adequate amounts, cannot promote sweating. Sodium depletion is accentuated by an insufficient intake and by the deranged function of the adrenal cortex which is said to affect the sodium control. Lichen tropicus, MacG. calls equine pellagra, and considers that it is due to a deficiency of vitamin B_2 and B_1 and to prolonged dilatation of the peripheral blood vessels. Heat-stroke, he ascribes to a hyperacute state of adrenal insufficiency bringing on anoxaemia, dehydration and consequent concentration of the blood—in fact, a state of shock, which can be brought to a climax by extreme atmospheric temperature.

" Kumri," he says, is a sequel to shock (produced by either sudden heat or cold), or anhydrosis (of which heat-shock is a hyperacute form). When it appears independently of either, it is the " acute and final expression of prolonged anoxemia, salt hunger plus adrenal insufficiency " which, because of its subdued form, has not previously given clinical expression.

Nerve tissue being peculiarly susceptible to lack of sufficient oxygen soon loses its efficiency and degenerates. Anoxaemia creates an increase of CO_2 in the muscles, an accumulation of lactic acid and a loss of glycogen. Muscular debility follows. Nerve degeneration is promoted by lack of available vitamin A. [No attempt appears to have been made to test by direct methods the validity of the assumptions, or the hypotheses which have been based upon them].

The treatment of anhydrosis by the addition of germinated gram and common salt to the diet and repeated doses of adrenal gland is advocated.—G. Williamson.

McEwen, A. D. (1937). **Necrotic Enteritis of Young Pigs Not Associated with Salmonella Infection.**—*Vet. Rec.* **49.** 1507-1509. [2 refs.]

Twenty-eight young pigs 6-12 weeks old were affected with a form of " necrotic enteritis " in which salmonella could not be found. The condition appeared sporadically among litters and M. compares it with forms of " necrotic enteritis " thought to be of dietary origin. The jejunum showed hyperaemia and the ileum diphtheritic deposit and thickening, sometimes causing occlusion of the lumen. A complete bacteriological protocol is not given, but cultures of heart blood, spleen, liver, lymph nodes and faeces of animals examined failed to show lactose-non-fermenters. [The actual lesions do not appear to have been bacteriologically examined and no attempt at transmission was made].—D. Slavin.

Hirt, G. (1937). A malacok himlőszeru bőrkiütésével egyidejuleg észlelhető gyomorelváltozásrol. [**Stomach Lesions in Pox-Like Disease of Piglets**]. —*Állatorv. Lapok.* **60.** 239-240. 5 figs. on 1 plate.

During the course of a chronic pox-like disease of young pigs which often occurs shortly after recovery from common infections in piglets, changes in the

mucous membrane of the fundus of the stomach and pyloric region are often present. They take the form of reddish-grey nodules of the size of a pinhead which give rise to linseed-sized ulcers with a dark red or dirty greyish-red surface. In histological sections the nodules appear as infarcts with hyaline degeneration of the arteries at the tips. Under the influence of gastric juices the infarcts become digested and result in ulcers. In addition there may be discoloured areas on the mucosa which are the result of haemorrhages on its surface.—G. S. (BUDAPEST).

LEASURE, E. E., & FRICK, E. J. (1937). **Bovine Allergic Dermatitis (?). A Preliminary Report.**—*Cornell Vet.* **27.** 331-337. 1 table.

Bovine allergic dermatitis appears to be caused by a primary sensitizing factor and a secondary exciting factor. The latter is the light of the sun and lesions are thus confined to the hairless and non-pigmented parts of the body, black areas being not at all affected and red areas only slightly. The sensitizing factor is present in pastures and in the cases described the yellow flowering and tumbling mustard (*Sisymbrium altissimum*) was incriminated, both as being common in all pastures where the disease occurred, and by feeding experiments.

Symptoms included fever and local acute superficial necrosis of the skin. General symptoms disappeared after 24 hours, but skin areas wrinkled, cracked and sloughed off as hard crusts. Healing occurred in 2-4 months, and a new hair coat was formed.

In some severe cases, the tongue, gums and cheeks had large necrotic areas. In these, general disturbance was prolonged, and finally " eyelids became swollen and glued shut, the nostrils became caked and the breath putrid, and a general cachexia resulted, the condition terminating in either death or recovery."

Tables of blood and urine analyses are included, but show little abnormality. Little is yet known of the pathology.

Treatment by intravenous injection of calcium gluconate or glucose relieved the general symptoms, including the pruritus. Locally various ointments were effective curatively and as fly repellents. Confinement by day and pasturing by night was also tried with success.—R. N. FIENNES.

JÁRMAI, K. (1937). A lipoidosisokról egy eset kapcsán. [**Lipoidosis, with a Description of One Case in a Horse**].—*Közl. Oesszehas. élet- és kórtan Köréből.* **28.** 85-104. 10 figs. [14 refs.]

A detailed description is given of generalized lipoidosis in an army horse which showed wheals, similar to those of urticaria, in the subcutaneous tissues of the head, body and extremities. The swellings were found to be filled with a yellow fatty mass which was found on histological examination to consist of infiltration of the fibrous connective tissue with lipoid material.—Z. DE CSUKÀS (MAGYARÓVÁR).

SÜLE, G. (1937). Kancák fedeztetése. [**The Mating of Mares**].—*Állatorv. Lapok.* **60.** 59-63. 7 tables. [6 refs.]

S. advises that mares should be taken to the stallion five days after the first service so as to get them in foal, if the first service was unsuccessful. Then they should be taken again 15 days later, which is the time of the next oestral period. The question is discussed at length. [The importance of these observations lies in failure to get mares in foal from ignorance of these intervals and the inference that sterility is then the cause of the trouble].—C. DE CSUKÀS (MAGYARÓVÁR).

CSÖGLEI, G. (1937). Adatok a szarvasmarha vaginajának és vulvajának kerbonctanához. [**Diseases of the Vagina and Vulva of Cows**].—*Inaug. Diss., Budapest.* pp. 16. [Numerous refs.] [German summary].

The following changes were found in the genital tract of 627 abattoir cattle. 2·28% showed malformation, 0·95% abnormal pigmentation, 0·79% cicatricial contraction, 5·74% cysts of Bartholin's glands, 7·97% cysts of Gärtner's ducts, 2·72% cysts elsewhere, 0·63% dilatation, 3·66% non-specific inflammation, 55·04% infectious catarrh, 1·43% tuberculosis and 1·05% tumours. One case of external endometriosis was seen consisting of groups of tumour like masses of the mucous membrane on the serous coat. In one of the seven cases of TB. the infection was limited to Gärtner's ducts. The tumours included three of carcinoma of the vulva, one of hard fibroma of the vestibule, one of basal cell carcinoma of the vagina and one wide and flat giant-celled sarcoma on the vaginal wall.

—G. Sályi (Budapest).

Olson, C. (1936). **A Study of Transmissible Fowl Leukosis.**—*J. Amer. vet. med. Ass.* **89.** 681-705. 11 figs., 3 tables. [17 refs.]

O. reports the results of transmission experiments with three strains of spontaneous erythroleucosis. Young chicks were used, and the disease was transmitted by means of whole blood, blood plasma and tissue emulsions. Turkeys, geese and ducks were not susceptible.

The symptoms, morbid appearances and histopathology are described in detail. Counts of the immature blood cells were not made, but four types are described and the blood of leucaemic birds was placed in four grades according to the predominance of these types. None of the three strains tended to produce a single type of leucosis. In most of the fowls in which erythroleucosis developed there was also evidence of "granuloblastic" leucosis, but in certain fowls the latter type only was present. Transition from one type to the other was also noted during the course of the disease.

No cases of neurolymphomatosis or neoplasm formation occurred. Complete recovery was observed in four cases, but transfusion of whole blood of normal and recovered chicks failed to arrest the course of the disease.—J. E. Wilson.

I. Stenszky, T. (1934). Adatok a tyúkok erythroleucosisának kórszövettanához. [**Histopathology of the Erythroleucosis of Fowls**].—*Közl. Oesszehas. élet- és kórtan köréből.* **26.** 269-275. [Numerous refs.]

II. Forfota, E. (1936). Röntgensugarak hatása az átoltható tyukleukosis (erythroleukosis) korképére és virusára. [**The Action of X-Rays on Fowl Leucosis Virus from Infected Fowls**].—*Állatorv. Lapok.* **59.** 311-313. [8 refs.]

I. A severe leucostasis was found in the blood vessels of the liver, spleen, and less regularly in those of the kidneys, in 21 experimental fowls dead of erythroleucosis, which before death had W.B.C. counts of 66,500-750,000 per c.c. In four anaemic fowls there was only a slight leucostasis in the spleen.

II. The effect of X-rays such as are used to treat human beings with leucaemia was tested on five groups containing a total of 18 hens artificially infected with erythroleucosis. The treatment had no effect.—G. Sályi.

Jungherr, E. (1937). **Studies on Fowl Paralysis. 2. Transmission Experiments.** —*Bull. Storrs agric. Exp. Sta.* No. 218. pp. 47. 26 figs., 4 tables, 8 charts. [Numerous refs.]

Out of transmission experiments with material from typical cases of fowl paralysis, six transmissible strains were established, four of which were carried through repeated passage. The injection of 128 chicks resulted in 49 apparent takes (38·2%), in comparison with a spontaneous incidence of neoplastic diseases of two cases (1·4%), among 144 controls.

The results as a whole indicate that lymphomatosis is transmissible; the causal agent was shown to be present in the blood, bone-marrow and nerve, and occasionally in faeces. The transmissible factor was found to withstand desiccation for periods up to 82 days and was considered to be in the nature of an ultramicroscopic agent.

These experiments confirm the results of other workers on this disease that small-cell neurolymphomatosis and large-cell lymphomatosis are aetiologically indistinguishable, and that the term lymphomatosis should be used without cellular qualification for transmissible lymphomatous alterations in the fowl. Iritis would also appear to be a manifestation of lymphomatosis. No evidence was obtained in these studies that there is an aetiological relationship between lymphomatosis and typical erythro- or myeloid-leucosis.—R. F. Gordon.

I. Bertolini, G. (1937). Il problema etiologico del granuloma di Röckl e l'ispezione sanitaria delle carni. [**Aetiology of Röckl's Granuloma**].—*Azione vet.* **6.** 589-591. 2 figs.

II. Ciarriocchi, E. (1937). A proposito di un caso di granuloma di Röckl in una bovina. [**Röckl's Granuloma in a Heifer**].—*Ibid.* 695-696.

I. Röckl's granuloma may be found in animals of either sex and any age, but is most frequent in older subjects. It may co-exist with perfect condition, but usually the affected animal is in poor condition. Generally nothing is noticeable about the living animal, the lesions being found on the muscles when the body is flayed. They appear as greyish-white nodules slightly projecting from the surface of the muscle. They are most common on the muscles along the back, shoulder and rump, and especially about the tail.

In about 16% of cases they have been found associated with tuberculous lesions of the lymph nodes or viscera. The nodules are described in detail with illustrations. B. reviews various theories, *i.e.* that the disease is definitely tuberculous, is caused by some kind of parasite, or by *Corynebacterium pyogenes*. He remarks that lesions caused by the latter are often found in animals with Röckl's granuloma. He agrees that where the disease is limited to superficial muscle the veterinary inspector need only order destruction of the parts actually affected.

II. A three-year-old cow, found afterwards to have been stalled with a cow undoubtedly tuberculous, was slaughtered because it proved sterile. It appeared in excellent condition and after inspection of the thorax and viscera the meat was passed as fit for consumption. When cut up yellowish nodules were found on the muscles.—S. F. J. Hodgman.

Mutch, J. R., & Griffith, H. D. (1937). **A Study of Diet in Relation to Health: Dark Adaptation as an Index of Adequate Vitamin A Intake. Technique and Preliminary Results.**—*Brit. med. J.* Sept. 18th. 565-570. 9 figs., 6 tables. [18 refs.]

The estimation of power of dark adaptation by means of Edmund's hemeralopia test type and Tscherning photometric glass is described and preliminary results are presented. A limit is shown below which all subjects react with improved adaptation to administration of vitamin A. Those whose first performance is above this limit give no response to vitamin A. [The method is of course not applicable to animals, but the paper is of interest as it concerns a condition dependent upon a vitamin deficiency].—R. Allcroft.

Thijn, J. W. (1936). Over een, naar aanleiding van likzucht, ingesteld morphologisch bloedonderzoek bij het gezonde en het zieke rund. [**The Blood**

Picture of Healthy and Sick Cattle with Reference to Pica]. —pp. 154. 8 text figs., 17 figs. on 2 plates, 35 tables. [Numerous refs.] Assen : Van Gorcum & Co. N.V. [8vo].

The protocols of this paper must be consulted in the original since they are too numerous for adequate abstracting.

The first six chapters deal with the blood picture in normal cattle in respect of numbers and size of erythrocytes, colour index, differential white count and other features. Chapters 6-9 deal with the morphological changes in various diseases. Chapter 10 deals particularly with " liksucht ", literally meaning " licking disease " and commonly translated " pica " since the early observations of Ostertag and Zuntz in 1907, but now better grouped amongst the " nutritional anaemias " associated with deficiency of " trace elements " and exemplified by the " bush sickness " of New Zealand, " enzootic marasmus " and " coast disease " of Australia, " salt-sick " of Florida, " nakuruitis " of Kenya, and " pining " of Scotland [see numerous previous abstracts in this *Bulletin*].

In the case of " liksucht " copper was the element incriminated by Sjollema [*V. B.* **5.** 580.] and the present paper reports clinical response to copper therapy and improvement in blood picture. A good description of the disease is given, illustrated by a photograph of an affected calf. The most outstanding feature of the blood findings is the low colour index.—H. H. Green.

Svanberg, D. (1936). Einige Beobachtungen über Wirkungen künstlicher Düngemittel auf Vegetation, Gesundheit der Tiere sowie auf Ernährungsmöglichkeiten des Bauernstandes in Schweden. [**Action of Artificial Manures on Vegetation and Animal Health in Sweden**].—*Biederm. Zbl.* **8.** 1-31. 1 fig., 8 tables. [Numerous refs.]

Aphosphorosis is the main deficiency disease in cattle and sheep in Sweden, and is much commoner than hitherto believed. Improvements in livestock were studied on 30 farms with cattle and three with sheep, formerly troubled with deficiency diseases and reduced sexual functions. Feeding minerals, chiefly sodium phosphate, and manuring with superphosphate gave good results, the latter procedure increasing both crop yield and phosphorus content without sacrifice of quality in other respects. Significance of other minerals in pastures is also discussed.—H. H. Green.

Malan, A. I. (1937). **Calcium and Phosphorous Metabolism in Relation to the Production of Osteodystrophic Diseases in Domestic Animals.**—*J. S. Afr. vet. med. Ass.* **8.** 91-97. [15 refs.]

A brief summary of the work done at Onderstepoort and overseas on the above subject is given. Experimental rickets is usually produced in animals kept on standardized diets, low in P, high in Ca and poor in vitamin D. Theiler and his associates showed that rickets could be produced in bovines by phosphorus-low diets in the presence of abundant vitamin D. This relation may and probably does hold for all species of domestic animals. Osteofibrosis in horses could be produced by a diet deficient in Ca or with a diet of high P and low Ca content. Rickets develops rapidly on a P-deficient diet while osteofibrosis due to low Ca takes a great deal longer to appear.—E. M. Robinson.

Lesage, J. (1937). Acide phosphorique du sol et maladies du bétail. [**Relationship of Animal Diseases to Phosphoric Acid in Soil**].—*Bull. Acad. vét. Fr.* **10.** 309-314.

A brief review is given of the importance of phosphoric acid in the soil for the production of good pastures and crops, and of the diseases of animals resulting

from a phosphate deficiency of the soil. Reference is made to the work of a few investigators on this subject.—R. ALLCROFT.

BOLLMAN, J. L., & SCHLOTTHAUER, C. F. (1937). **Experimental Gout in Turkeys.** —*Amer. J. Digest. Dis. Nutr.* **3.** 483-488. 5 figs., 3 tables. [11 refs.] [Copied *verbatim* from *Int. Rev. Poult. Sci.* **10.** 116].

Feeding raised the blood uric acid level markedly in turkeys. A high protein diet, or addition of urea to the diet, raised the blood uric acid still further. If high blood uric acid is maintained for several days, gouty tophi appear in the joints. Damage to the kidneys by intramuscular injections of lead or uranium salts hastened the appearance of the deposits of urates in the joints.

I. RINGROSE, A. T., & NORRIS, L. C. (1936). **Differentiation between Vitamin G and an Insoluble Factor Preventing a Pellagra-like Syndrome in Chicks.** —*J. Nutrit.* **12.** 535-552. 1 plate, 3 tables. [15 refs.] [Copied *verbatim* from summary on p. 535].

II. RINGROSE, A. T., & NORRIS, L. C. (1936). **Differentiation between Vitamin G and a Soluble Factor Preventing a Pellagra-like Syndrome in Chicks.**— *Ibid.* 553-569. 5 tables. [17 refs.] [Copied *verbatim* from summary on p. 553].

I. Evidence has been presented which shows that dried pork liver contains a factor required to prevent the development of a pellagra-like syndrome in chicks fed an egg-white diet and a factor required for the growth of chicks fed a purified-casein diet. This growth-promoting factor was soluble in an alcohol-water solution, was stable to heating in a dry atmosphere and relatively stable to autoclaving at pH 11. On the other hand, the pellagra-preventing factor was insoluble in an alcohol-water solution, was destroyed by heating in a dry atmosphere and by autoclaving at pH 11 but not at pH 9. This demonstrates that the pellagra-preventing factor is separate from the growth-promoting factor. The growth-promoting factor is vitamin G.

Evidence has also been presented which strongly indicates that the pellagra-like syndrome which develops in chicks fed the egg-white diet is identical with that which develops to a lesser extent in chicks fed the purified casein diet.

When egg white was autoclaved for 6 hours at 15 pounds pressure at pH 5·9 to 6·0 or pH 9 it no longer caused the development of the pellagra-like syndrome. It is believed the more probable explanation of this is that the pellagra-preventing factor is formed or released during autoclaving rather than that a toxic factor is destroyed, in view of the apparent identity of the pellagra-like syndrome and since raw egg-white is almost the only source of protein used by the developing chick embryo.

II. Evidence has been presented which shows that dried pork liver contains a factor required to prevent the development of a pellagra-like syndrome in chicks fed a heated casein diet and a factor required for the growth of chicks fed a purified-casein diet. Both of these factors are soluble in an alcohol-water mixture and sensitive to autoclaving at pH 11.

The pellagra-preventing factor was destroyed by heating in a dry atmosphere for 144 hours at 100°C. or 50 hours at 120°C. while the growth-promoting factor was relatively stable to this treatment. The pellagra-preventing factor was not adsorbed from liver extract by fuller's earth while the growth-promoting factor was adsorbed. Vitamin G is, therefore, a complex consisting of two components, one of which is pellagra-preventing while the other of which is essentially growth-promoting.

The pellagra-preventing factor was found to be present in the cereals only of a cereal, casein diet and not in the casein. Coagulated egg white was shown to contain the pellagra-preventing factor but whether raw egg white also contained this factor could not be determined from the results.

Further evidence was obtained which indicated the identity of the pellagra-like syndrome which develops in chicks fed the heated casein diet with that which develops in chicks fed a raw egg-white diet. Two factors were required to prevent the development of the syndrome, since one of these was soluble in an alcohol-water mixture while the other was insoluble. One was also more sensitive to autoclaving at pH 11 than the other but both were destroyed by prolonged heating in a dry atmosphere.

Lyons, M., & Insko, W. M., Jr. (1937). **Chondrodystrophy in the Chick Embryo Produced by Manganese Deficiency in the Diet of the Hen.**—*Bull. Ky agric. Exp. Sta.* No. 371. pp. 61-75. 2 figs., 5 tables. [14 refs.]

Sixteen Rhode Island Red laying pullets were divided into two groups of eight, one group receiving a basal ration known to produce slipped tendon in chicks and the other the same ration supplemented by 40 p.p.m. each of manganese and zinc and 100 p.p.m. of iron. Eggs produced by hens fed the basal ration for 75 days gave a very low hatchability, with a peak of embryo mortality on the 20th and 21st day of incubation ; the embryos that died after the tenth day of incubation were chondrodystrophic. Hens fed the supplemented ration produced eggs giving good hatchability of normal chicks and the dead embryos from this group showed normal skeletal development.

Chondrodystrophy was completely prevented by the injection of 0·03 mg. of manganese directly into the albumen of eggs from the chondrodystrophic group ; injection of the same amount of zinc was ineffective, while practically all the embryos from eggs injected with an equal amount of iron died during the first week of incubation.

The manganese content of both chondrodystrophic embryos and eggs producing this condition was lower than that of normal embryos and eggs.—R. A.

PUBLIC HEALTH.

Bendixen, H. C. (1937). Traek af Maelkehygiejnens Udvikling i nogle europaeiske Lande de senere Aar. [**Recent Progress in Milk Hygiene in Europe**]. —*Medlemsbl. danske Dyrlaegeforen.* **20.** 45-50, 73-81, 119-127 and 184-195. [3 refs.]

The tendency to centralize producers' organizations has been obvious. At the same time systems of grading milk for quality have been introduced by legal provisions. The new grading system of England and Wales based upon the modified methylene blue test is mentioned. The importance of milk-borne diseases has in most countries caused a growing feeling that milk ought to be pasteurized before delivery to the consumer. Only milk produced in herds free from tuberculosis, brucellosis and mastitis should be sold raw, and at the same time a strict veterinary and medical supervision of the herds and personnel should be carried out. Attempts to free milk from pathogenic bacteria originating from cattle are now in nearly every case based on eradication programmes.

I. Matthews, H. T. (1936). **The Accredited Milk Scheme in Operation.**—*J. R. sanit. Inst.* **57.** 231-244. 2 figs. [Reprinted in *Vet. Rec.* **48.** 1427-1429].

II. Davidson, F. A. (1937). **The Protection of Bulk Milk : With Special Reference to Bovine Tuberculosis.**—*Ibid.* **58.** 217-239. 7 tables.

I. This is a review of the progress of the Accredited Milk Scheme in Great Britain, and emphasizes the good influence of progressive local authorities that provide education in milk hygiene.

There has been lack of uniformity in carrying out the provisions of the Milk and Dairies Order of 1926, and neglect by many local authorities administering this Order, which, to a certain extent, is due to variation in farming practice in different parts of the country. M. suggests that a milking machine may be a dangerous weapon in the hands of the average farm labourer, and wonders whether a sterilizer is always necessary, and if refrigeration on the farm is worth the cost. dangerous weapon in the hands of the average farm labourer, whether a sterilizer is always necessary, and whether refrigeration on the farm is worth the cost. Points of veterinary importance such as non-tuberculous, indurated udder and chronic uterine discharge from cows are discussed.

M. is of the opinion that if bonuses are to be distributed, they should be for calves reared to milking age rather than on the quantity of milk delivered.

II. D. suggests that for the eradication of TB. from dairy herds the "Attested" herd scheme is not suitable. He suggests that eradication can best be carried out over a period of 3-5 years by tuberculin testing and the removal of reactors.

He points out the difficulties in tracing the source of infection, and in following up infected bulk samples, as so much mixing of partially-filled churns takes place.

He is of the opinion that routine herd inspection is helpful for the eradication of TB. and that cases of tuberculous mastitis are mostly due to rearing heifer calves on infected milk.

The herd inspection in Staffordshire during the previous two and a half years had the following effects :– (1) average age of the cows reduced by two years ; (2) increase and improvement in young stock ; (3) earlier removal of clinical cases with reduction of gross infection ; (4) more interest in eradication of TB., Johne's disease, mastitis and contagious abortion ; (5) improvement in hygiene of cow-sheds, water supplies and drainage, and (6) collection of herd histories which are essential in advising on tuberculin testing.

D. states that mastitis is the most serious economic problem of the dairy farmer, but that it can be definitely controlled by proper hygienic and preventive means.—Brennan DeVine.

van Oijen, C. F. (1937). De beteekenis van het rapport van Prof. G. F. Wilson, getiteld " The Bacteriological Grading of Milk " voor de Nederlandsche kwaliteitsbepaling der consumptiemelk. [**The Significance for Milk Quality Tests in Holland of Wilson's Report on the Bacteriological Grading of Milk**].—*Tijdschr. Diergeneesk.* **64.** 873-890. 2 tables. [5 refs.]

The author is of the opinion that the modified reductase test is useful for dividing milk into that which is suitable and unsuitable for human consumption, a decision which can also be reached by using Breed's method of direct counting. However, for more exact grading of milk more accurate methods are required, such as the *Bacterium coli* count, for which Frost's small-plate method is recommended.—C. Bubberman (Schiedam).

I. Humphriss, E., Peden, D., & Wright, H. D. (1937). **The Adequacy of Commercial Pasteurisation for Destruction of Tubercle Bacilli.**—*Lancet.* **233.** 151-152. 2 tables. [8 refs.]

II. Hoy, W. A., & Neave, F. K. (1937). **The Phosphatase Test for Efficient Pasteurisation.**—*Ibid.* 595-598. 8 tables. [1 ref.]

I. The authors consider that commercial pasteurization, details of which are submitted, is a completely effective process if properly carried out and adequately supervised. Out of the 102 samples of pasteurized milk collected from a commercial plant in the course of a year and examined by g. pig inoculation, in not one instance was it possible to demonstrate the presence of live tubercle bacilli, although these organisms were present in 61 of the corresponding raw samples.

II. Statistics are submitted of the results of the application of the phosphatase test to samples of pasteurized milk in London and elsewhere during the earlier months of 1937. Compared with the results obtained in a similar survey in 1935, they indicate a definite improvement in the efficiency of the plants, particularly those of the larger firms. But in the case of firms of intermediate or of small size the efficiency is regarded as being still far from satisfactory.—H. V. Hughes.

Saba, M. (1936). Inspection des viandes et abattoirs en Syrie. [**Meat Inspection in Syria**].—*Rec. Méd. vét. exot.* **9.** 70-83. [See also *V. B.* **8.** 176].

S. prefaces a survey of the meat inspection services in Syria by referring to the draft regulations governing the qualifications of veterinary meat inspectors which, drawn up in December, 1934, are under consideration by the High Commissioner's department and which will no doubt be issued as definite regulations.

He refers especially to meat inspection in the north, the capital of which is Aleppo (population 270,000) and the south, the capital of which is Damascus (population 250,000), these districts being best known to the author. Aleppo is the chief cattle-market centre in Syria. According to the 1935 census the livestock of Syria consisted of 54,468 horses, 26,224 mules, 13,335 asses, 5,217 buffaloes, 238,840 oxen, 1,362 sheep, 886,097 goats, 72,164 camels and 483 pigs, excluding goats and sheep under one year old.

Tables are given showing the number of animals slaughtered in public abattoirs during January-September 1935, but exclude animals killed on private premises for home consumption.

A comprehensive account is given of the varieties, characters and uses of the various kinds of cattle, sheep and goats found in Syria.—H. Burrow.

Blanchard, L., & Houdinière, A. (1937). Recherche sur la présence d'acétone dans le muscle des animaux de boucherie. [**Acetone in the Muscles of Slaughter Animals**].—*Rec. Méd. vét.* **113.** 811-819. 3 tables. [5 refs.]

Analyses show that the muscles of healthy animals immediately after slaughter contain practically no acetone. In some cases, however, muscle may contain as much as 11·5 mg. %, which is sufficient to produce a pronounced odour making the meat unfit for sale. This is often, but not always, the case in animals slaughtered during the later stages of pregnancy or when affected with febrile conditions.
—J. A. Nicholson.

I. Burndred, E. J. (1936). **Abattoirs and Meat Inspection—a Review.**—*J. R. sanit. Inst.* **57.** 215-230. [5 refs.] [Reprinted in *Vet. Rec.* **48.** 1422-1427].

II. Allen, C. G. (1937). **The Detection of Diseased Lesions in the Offal and Carcasses of Animals Slaughtered for Food.**—*Ibid.* **58.** 206-216.

I. B. points out that, whereas 92 % of animals slaughtered for food in Scotland are dealt with in public abattoirs, the figure for England is only 27 %. He explains the advantages in large abattoirs of distributing the slaughtering over the whole of

the week, rather than concentrating the work during part of the week. He further stresses the enormous waste that occurs in the absence of proper treatment of all by-products.

B. favours multi-floored buildings, the bleeding and dressing of carcasses to take place on the top floor, manure and waste products being passed out through chutes.

The abolition of private abattoirs and the centralization of slaughtering would bring about the much needed uniformity of meat inspection.

II. A. emphasizes the advantages of *ante-mortem* inspection. Memo. 62/Foods (Ministry of Health) is helpful in fixing the standard upon which to work in judging carcasses which are unfit for human consumption.—Brennan DeVine.

Reitsma, K. (1937). De ontwikkeling van het slachthuiswezen in Nederland in de laatste 25 jaar. [**Progress in Abbatoir Science in Holland in the Last 25 Years**].—*Tijdschr. Diergeneesk.* **64.** 1183-1190. 1 table, 1 chart.

A review of the continual progress of abattoir science in Holland (which had 15 municipal abattoirs in 1912 and now has 82), mainly due to the enforcement of the Meat Inspection Act. The old Osthoff type of abattoir has been replaced by the more efficient Lohausen-Osthoff-Uhlmann Type. The automatic captive bolt apparatus is an advance from the older methods of stunning; some abattoirs stun pigs electrically (60-80 volts for 15-25 seconds); the ammonia compressor has replaced the older SO_2 and CO_2 types of refrigerating machinery. The destruction-plants under state control guarantee the efficient removal and destruction of condemned meat.—C. Bubberman (Schiedam).

Petit, G. (1936). Les virus " raticides " sont-ils dangereux ? [**The Danger Following the Use of Bacterial Rat Killers**].—*Rev. Path. comp.* **36.** 1115-1123. [8 refs.]

The " Danysz " and " ratin " strains of *Salmonella typhi-murium* have been used as raticides in France for a considerable time without one single case of infection in man or animals being reported. As evidence of the innocuity of these strains, P. quotes the opinions of several French and Danish workers. His own experiments have shown that " ratin " does not infect or set up symptoms in the black rat, g. pig, rabbit or in domestic animals and poultry. It is considered that the use of these " viruses " constitutes an effective method for exterminating rats. P. states that in Germany, cultures containing a species of salmonella of doubtful identity were used for killing rodents, but as cases of illness in human beings were reported their use is now prohibited [see *V. B.* **5.** 754].—N. J. S.

THERAPEUTICS.

Salle, A. J., McOmie, W. A., & Shechmeister, I. L. (1937). **A New Method for the Evaluation of Germicidal Substances.**—*J. Bact.* **34.** 267-273. 2 tables. [9 refs.]

The authors suggest that germicides for internal administration or for use on mucous membranes should be tested for their toxic effect on the growth of living embryonic tissue as well as for their ability to kill bacteria. They recommend the adoption of a " toxicity index ", *viz*, the ratio of the highest dilution of disinfectant required to prevent the growth of embryonic chick heart during 48 hours to the dilution required to kill a given test organism in ten minutes.—A. R.

Browning, C. H. (1937). **Chemotherapeutic Antiseptics.**—*Edinb. med. J.* **44.** 497-521. 2 figs., 1 table. [Numerous refs.]

A survey of the development of chemotherapy from the early work of Lister, inspired by Pasteur's work on the organismal cause of fermentation, to the present day; the sulphonamides are only mentioned and not discussed. The findings of Ehrlich and Shiga (1904) that an acutely fatal infection in mice due to trypanosomes could be cured by a single dose of a synthetic dye-stuff, trypan red, and of Morgeroth, Levy and Kaufmann that optoquin will cure mice infected with virulent pneumococci, are stressed as important stepping stones. A large part of the paper is devoted to the important work of Browning and his collaborators in the discovery and investigation of new chemotherapeutic antiseptics, especially the flavines. The methods used in the testing of these substances are discussed in detail, and their use in the treatment of recent experimental infection is described. It is emphasized that the pharmacological activity of the flavines needs careful investigation, and that further work is necessary. A number of practical applications of the flavine antiseptics, *e.g.*, to the skin, mucous membranes, urinary tract, etc., are considered. Lastly the properties desirable in chemotherapeutic antiseptics are considered, in relation to the known properties of some of these substances, especially those of the acridine and of the quinoline group.—J. M. R.

Schmidt-Hoensdorf, F. (1937). Ein neuer Weg zur Bekämpfung der Streptokokken-Mastitis. [**A New Way of Controlling Mastitis**].—*Berl. tierärztl. Wschr.* Nov. 19th. 713-715.

Complete bacteriological and clinical examination is made of each quarter of the udder in the entire herd. Mastitis animals are then treated by injection of 50-100 ml. of " argento-weidnerit " (a compound of sulphocyanide and silver) into the teat of the affected quarter. S. claims for such treatment a very high percentage of cures. The preparation is non-irritant and can be given to lactating or dry cows. Some chronic cases responded to treatment with a larger amount of the infusion after failure to respond to the usual amount.—D. Slavin.

I. Barke, A. (1937). Ueber die Wirkung von Prontosil auf den überlebenden Katzendarm. [**Action of Prontosil on the Isolated Cat Intestine**].—*Dtsch. tierärztl. Wschr.* **45.** 509-510. 3 figs. [9 refs.]

II. Harms, F. (1937). Das Chemotherapeutikum " Prontosil ". [**Prontosil**].—*Ibid.* 510-512. 2 tables. [15 refs.]

III. Kenny, M., Johnston, F. D., von Haebler, T., & Miles, A. A. (1937). **p-Aminobenzenesulphonamide in Treatment of Bacterium coli Infections of the Urinary Tract.**—*Lancet.* **233.** 119-126. 4 figs., 6 tables. [17 refs.]

IV. Snodgrass, W. R., & Anderson, T. (1937). **Prontosil in the Treatment of Erysipelas. A Controlled Series of 312 Cases.**—*Brit. med. J.* July 17th. 101-104. 6 tables. [5 refs.]

I. Cat's small intestine was suspended in Ringer solution. Addition of prontosil produces a contraction ; this effect appears to be increased by HCl.

II. Experiments *in vitro* show that prontosil exerts no bactericidal action on *Streptococcus pyogenes*, *Str. equi*, *Brucella abortus*, *Salmonella paratyphi* B, and *S. enteritidis* Gärtner. In all experiments prontosil exerted a protective action against infections of mice with *Str.p.*, but not against infections with *S.e.* Gärtner, *S. abortus equi*, pneumococci and g. pigs infected with *Br.a.* The possible use of prontosil in streptococcal joint-ill of foals is discussed.

III. Small doses of p-aminobenzenesulphonamide caused a rapid disappearance of *Bact. coli* and pus cells from the urine, and remission of symptoms in

46 women with urinary tract infections. Sulphanilamide administered *per os* renders the urine bactericidal to certain members of the *Bact. coli* group, but strains which are resistant to the bactericidal action of sulphanilamide *in vitro* are not necessarily so *in vivo*.

IV. 312 cases of erysipelas were treated under controlled conditions with :– (a) ultra-violet light ; (b) prontosil ; (c) ultra-violet light and prontosil, and (d) scarlet fever antitoxin. The average dose of prontosil was 5 g. and the average duration of the treatment was two days. The cumulative evidence indicates that the cases which received prontosil showed better results in respect of curtailment of :– (1) the duration of the spread of the local lesion ; (2) the duration of primary pyrexia, and (3) the duration of toxaemia.—J. M. Robson.

Montestruc, E. (1937). Essais de traitement des streptococcies expérimentales du rat et du lapin par injections sous-cutanées de 1162 F., en suspension dans l'huile et dans l'huile-lanoline. [**Treatment of Experimental Streptococcus Infection of the Rat and Rabbit by Subcutaneous Injections of 1162 F., Suspended in Oil and in Lanoline-Oil**].—*Bull. Soc. Path. exot.* **30.** 265-268.

Subcutaneous injections of 0·05 g. of 1162 F. (p-aminophenylsulphamide) in oil produce a 50-75 % survival rate of mice infected with lethal doses of streptococci. In rabbits 0·2 g. per kg. produces a 75 % survival rate and 0·5 g. a 100 % survival rate. It is suggested that these favourable results are due to slow and regular absorption of the drug. Addition of lanoline to the oily suspension gives worse, instead of better results.—J. M. Robson.

Trillat, A. (1936). Guérison d'une trypanosomiase expérimentale chez la souris par inhalation de vapeurs de moranyl. [**Cure of Experimental Trypanosomiasis in the Mouse by Inhalation of Moranyl**].—*Bull. Acad. Méd. Paris.* **116.** 75-77. [5 refs.]

It was found that in 252 mice *Trypanosoma brucei* infection was arrested by three hours' inhalation of less than 0·75 mg. of moranyl dispersed as a cloud. —J. M. Robson.

von Jancso, N., & von Jancso, H. (1936). Chemotherapeutische Wirkung und Kohlehydratstoffwechsel. Die Heilwirkung von Guanidinderivaten auf die Trypanosomeninfektion. [**Chemotherapeutic Action and Carbohydrate Metabolism. Curative Value of Guanidin Derivatives in Trypanosome Infection**].—*Z. ImmunForsch.* **86.** 1-30. 5 figs., 5 tables. [Num. refs.]

Previous experiments have shown that the curative action of germanin is due to an inhibition of the sugar metabolism of the trypanosomes. In the present experiments the action of guanidin derivatives on mice infected with *Tryp. brucei* was investigated ; repeated non-toxic doses of decamethylenediguanide ("synthalin") produced a cure; less marked effects (essentially inhibition of multiplication) were produced by dodecamethylenediguanide, tri-pentamethylene-triamine-guanide and dipentamethylene-thioether-diguanide. Characteristic effects similar to those produced by germanin were obtained, *viz* :– (1) a slow cyclical degeneration of the flagellates ; (2) typical morphological changes, including the formation of degenerative and giant forms, and (3) the reticulo-endothelial system plays a definite part in the curative action. It is therefore concluded that the action of guanidin compounds is due to their effect on sugar metabolism ; it is suggested that the effect is indirect and consists of a blockade of the sugar metabolism of the parasites ; it has been shown that the metabolism of the parasites varies with

the sugar concentration. By the administration of large doses of insulin inhibition of multiplication of parasites and the formation of typical degenerative forms has also been produced.—J. M. Robson.

Glowazky, F. (1937). Der Stoffwechsel der Trypanosomen unter der Einwirkung von Chemotherapeutica in vivo. [**The Influence of Drug Treatment** *in vivo* **on the Metabolism of Trypanosomes**].—*Z. Hyg. InfektKr.* **119.** 741-752. 10 tables. [13 refs.]

In estimating the metabolic activity of trypanosomes, G. used suspensions in buffered plasma containing 0·4% of glucose. Estimations were made of the amount of oxygen used by 100 million trypanosomes in one hour and of the amount of CO_2 produced in the same time. An analysis was also made of the alcohol, aldehyde, methyl-ketone, lactic acid, oxalic acid, glycerol and other products in the suspensions by Fiegl's method. It was found that the trypanosomes from individual animals varied greatly in their metabolic activity, but that the results given by trypanosomes from the same animal remained relatively constant.

To ascertain the action of drugs, 60 c.c. of blood, containing untreated trypanosomes, was taken from the heart, the drug to be tested was then injected, and 30 minutes later a second sample of blood, containing treated trypanosomes, was taken, suspensions of trypanosomes being made from each sample. Under the influence of acriflavine or " sulfoharnstoff " (a gold compound) there was a distinct decrease in the amount of oxygen used, and glycerol production could be detected. Trypanosomes removed 30 minutes after treatment with atoxyl showed no variation from the normal, but if the atoxyl was replaced by p-aminophenylarsenoxide, or if the atoxyl was allowed to act for six hours, the results were similar to those of acriflavine. Germanin acted in a similar manner to atoxyl, whilst human serum and organic extracts failed to affect the metabolic activity.

It is suggested that treatment affected the ferment activity of the trypanosomes, thus preventing the conversion of glycercol into pyroracemic acid.—U. F. R.

I. Russo, L. (1937). Osservazioni pratiche sulla terapia con lo stovarsol sodio dell'agalassia contagiosa delle pecore e delle capre. [**Treatment of Contagious Agalactia of Sheep and Goats with Stovarsol**].—*Nuova Vet.* **15.** 375-376.

II. Petrillo, B. (1937). L'agalassia contagiosa delle pecore e delle capre in provincia di Matera. [**Contagious Agalactia of Sheep and Goats in Matera Province, Italy**].—*Clin. vet., Milano.* **60.** 571-575. [17 refs.]

I. Starting in the spring, the disease spreads and intensifies in the summer, disappearing in the autumn and winter; infection spreads slowly. Goats are more subject to infection than sheep; in a case noted by R. the disease spread for three months amongst the goats without affecting any of 100 sheep kept quite close to them. R's own experience with the use of stovarsol leads him to deny that it is a specific for the disease, though he obtained some good results with it.

II. The disease generally appears in January, spreads from May onwards and gradually disappears in the autumn. A frequent source of infection is water in which infected animals have previously been washed. P. tested the value of stovarsol but his results were negative and he concludes that the treatment proved ineffectual.—S. F. J. Hodgman.

Cawston, F. G. (1936). **Destruction of the Bilharzia Parasites of Man.**—*S. Afr. med. J.* **10.** 608-610. [1 ref.]

C. recommends the use of " anthiomaline " or fouadin for the treatment of bilharzia infection in man instead of antimony potassium tartrate, which may

contain a number of impurities. The paper is a record of a number of cases treated with these drugs and some in addition treated with " stibilase " and " trystibine ".—E. M. Robinson.

Sniečkiene, P. (1937). Sidabriniu lapiu plauciu nematodai ir kova su jais jodjodkalio skiedinio intratrachejiniais išvirkštimais. [**Treatment of Lungworms in Foxes with Iodine**].—*Vet. ir Zootech., Kovno.* **14.** 1-13. 1 fig., 2 tables. [17 refs.] [German summary].

Lungworms were found to be the cause of mortality on silver fox farms. In 1935, 51% of the foxes examined were found to have died from this cause. For the purpose of treatment iodine (1% aqueous solution) was used diluted 15 times with warm water and doses of 3-4 c.c. were injected intratracheally into each fox, the dose being repeated every five days. As a result, the mortality in the young foxes fell from 51% to 12·3% but, at the same time, sterility of breeding foxes rose from 6·7% to 32·2%.—A. Pabijanskas (Kaunas).

Hutschenreiter, C. (1937). Epiphysan G. Richter bei traumatischen und rheumatischen Muskelentzündungen der Pferde. [**Treatment of Myositis in Horses with Epiphysan**].—*Tierärztl. Rdsch.* **43.** 75-79. [3 refs.] [See also *V. B.* **7.** 551].

Epiphysan has been used in the treatment of several diseases and this article describes the treatment of 17 cases of acute and chronic myositis by subcutaneous injection of this pineal body extract. The results make the author speak favourably as regards its future use in such cases.—James Stewart.

POISONS AND POISONING.

Rambe, L. (1936). Undersökningar angaende koksaltbelastnings inverkan på vissa fysiologiska funktioner hos nötkreatur. Kroniska giftverkningar vid långvarigt koksaltöverskott i utfodringsstaten. [**The Physiological Importance of Common Salt. Poisoning by Over-Dosage**].—*Svensk Vet Tidskr.* **41.** 349-358. 1 table. [1 ref.]

In an earlier publication [*V. B.* **6.** 269.] R. advanced the theory that a certain form of malnutrition (" torkan ") may be due to excess of common salt in the rations of cows, and that the toxic dose of NaCl is smaller than is generally believed.

In the present article he reports on some preliminary feeding experiments with salt, a bovine being given amounts increasing from 30-250 g. per day. As a result it showed signs of pruritus and an abnormal amount of salt was excreted from the skin, skin scrapings having been removed and analysed daily. The animal also showed polyuria and attacks of renal haemorrhage lasting for 6-24 hours. During the experiment, which lasted for over 12 months, the red blood cell counts of the test animal fell from 10 to 5·7 million per c.mm.—Gustav Naerland (Oslo).

Velu, H. (1936). Les eaux chlorurées sodiques conviennent-elles pour l'abreuvement du bétail ? [**Suitability of Salty (Brackish) Water for Cattle**].—*Arch. Inst. Pasteur Algér.* **14.** 332-352. 5 tables. [16 refs.]

The first half of the paper is devoted to a résumé of all the known literature concerning salt water and its effect on animals. In the second half V. describes experiments carried out on sheep, cattle and g. pigs. These were designed to establish the optimal amount of salt water compatible with excellent health as

well as the maximum amounts which could be given to these animals without producing any ill effects. An interesting finding was that cattle could drink large quantities of salt water without increasing the water content of the tissues, which had been suggested by other authors. [The value of the work would have been greatly enhanced if blood analysis had been carried out on the experimental animals].
—James Stewart.

Leinati, L. (1937). Contributo allo studio della fluorosi nei bovini. [**Fluorine Poisoning in Cattle**].—*Nuovo Ercol.* **42.** 385-389.

Estimations of the alkali reserve, blood P and blood Ca of two cows showing typical symptoms of fluoride poisoning indicated that there was an acidosis with a low blood P, whereas the blood Ca was normal. This is not the case in the early stages of poisoning, when the blood P is normal and there is no marked acidosis.
—J. A. Nicholson.

Spéder, & Chiarnot. (1937). Syndromes osseux du type hyperparathyroidien et du type hypoparathyroidien provoqués par l'intoxication par les divers sels de fluor et des intoxications minérales associées. [**Bone Lesions Due to Fluorine Poisoning**].—*Maroc méd.* **17.** 405-408. 3 figs.

From experiments on rabbits it is concluded that chronic fluoride poisoning produces in all cases general bone lesions, the type of lesion depending on the particular fluoride salt ingested. Hypercalcification results from calcium fluoride poisoning while ingestion of sodium fluoride, or of calcium fluoride plus certain aluminium salts such as the acetate or chloride (these salts occur naturally in the phosphate deposits of the district) produces a hypocalcification and skeletal modifications resembling lesions caused by hyperparathyroidism.

No experimental details are described.—R. Allcroft.

A. Miller, J. T., & Byers, H. G. (1937). **Selenium in Plants in Relation to its Occurrence in Soils.**—*J. agric. Res.* **55.** 59-68. 5 figs., 1 table. [4 refs.]

B. Knight, S. H., & Beath, O. A. (1937). **The Occurrence of Selenium and Seleniferous Vegetation in Wyoming. Part I. The Rocks and Soils of Wyoming and their Relations to the Selenium Problem. Part II. Seleniferous Vegetation of Wyoming.**—*Bull. Wyo. agric. Exp. Sta.* No. 221. pp. 64. 14 figs., 1 table. [Numerous refs.]

A. From observations made over wide areas on soils and vegetation in respect of Se content, plants may be classified into three groups in regard to tolerance of soil Se :- (a) those capable of absorbing Se readily, being rare on, or absent from, non-seleniferous soils ; (b) those capable of absorbing moderate quantities of Se without injury, occurring in both seleniferous and non-seleniferous areas, and (c) those with a very limited tolerance for Se, making poor growth on seleniferous soils.

B. Part I. The geology of Wyoming is surveyed with particular reference to seleniferous rocks and soils.

Part II. Seleniferous vegetation may be divided into two general groups :- (a) those plants, occurring locally, which induce " alkali disease " when ingested, and (b) those plants, more widely distributed and chiefly weeds, which induce " blind staggers ". The excreta of animals grazing upon these types of vegetation contain considerable amounts of Se. In the early stages of " alkali disease " daily drenchings with calcium lactate coupled with feeding on selenium-free foods were an effective means of treatment, while there was a fair response to iron and strychnine tonics in the early stages of " blind staggers ". No known treatment is of value in advanced cases of these diseases.—Alfred Eden.

Durrell, L. W., & Newsom, I. E. (1936). **Poisonous and Injurious Plants of Colorado.**—*Bull. Colo. agric. Exp. Sta.* No. 429. pp. 75. 89 figs.

A concise account of over 150 wild plants which poison livestock in Colorado, many of which are also of general interest to other territories. Line drawings are given of most of the plants.—J. E.

Rimington, C., & Quin, J. I. (1937). **Dik-Oor or Geel-Dikkop on Grass-Veld Pastures.**—*J. S. Afr. vet. med. Ass.* **8.** 141-146. 4 figs. [8 refs.]

An outbreak of photosensitization in sheep known locally as " dikoor " and similar to the disease " geeldikkop " caused by feeding on *Tribulus* plants, is described. In this case the photosensitization, characterized by swollen ears and face, constipation and yellow discoloration of the conjunctivae, was attributed to grazing on two *Pannicum* species, *P. laevifolium* and *P. coloratum*. These *Pannicum* species are only sufficiently toxic at certain times to cause photosensitization. A chemical investigation has been commenced in the attempt to isolate sufficient of the toxin for experimental work.—E. M. Robinson.

Saunier, H. L. (1936). La nielle des blés. Contribution à l'étude du githagisme et de la githagine. [**Corn-Cockle Poisoning**].—*Thesis, Lyons.* pp. 86. [Numerous refs.]

Ingestion of the seeds of the corn-cockle (*Lychnis githago*) present in inferior quality wheat grains or flour, causes symptoms of poisoning in man and in domesticated animals. Carnivora, horses and young animals of all species are most sensitive to the poison, but ruminants, pigs, poultry and rodentia are less susceptible. The dog, fowl and g. pig will not voluntarily eat food in any way contaminated by these seeds. The action of the poison is to cause local or general ulceration and necrosis of the alimentary tract accompanied by generalized paralysis ; lesions may also occur in the liver, spleen and lungs, while the blood becomes haemolysed.

The active principle is a saponin (githagin) responsible for the haemolysis, located in the embryo and cotyledon of the seeds, and its presence can be detected and estimated by chemical and microscopical tests and by a haemolytic method fully described. Affected animals respond to laxatives and stimulants and suppression of contaminated food.—Alfred Eden.

Quick, A. J. (1937). **The Coagulation Defect in Sweet Clover Disease and in the Haemorrhagic Chick Disease of Dietary Origin.**—*Amer. J. Physiol.* **118.** 260-271.

Feeding of improperly cured sweet clover hay was found to produce in both rabbits and chickens a pronounced fall in the prothrombin level of the blood, the coagulability of the blood being markedly reduced. Incorporation of 5% of dehydrated alfalfa meal in the diet was found to cure or prevent the condition. It is suggested that spoiled sweet clover hay contains a toxic principle which either destroys prothrombin or inhibits its production.—A. Robertson.

Kooistra, R. (1937). Ergotismus gangraenosus bij konijnen. [**Ergotism in Rabbits**].—*Tijdschr. Diergeneesk.* **64.** 721-722. 1 fig.

A description is given of a case of ergotism in the rabbit, showing ptyalism, diarrhoea and after ten days oedema of the ear tips followed by necrosis. The food contained 1·5% infected grains.—C. Bubberman (Schiedam).

Cordier, D. (1937). L'asphyxie dans les intoxications produites chez les animaux par les gaz. [**Asphyxia Caused by Poison Gas in Animals**].—*Rec. Méd. vét.* **113.** 745-757.

There are several ways in which anoxia may be induced in animals by poison gases. Phosgene and chloropicrin act by causing a constriction of the bronchi, whilst a mechanical closure is effected by mustard gas through the bronchial lesions produced. Such gases as phosgene, chloropicrin and organic arsenicals induce irritation of the nerve endings causing a reflex vaso-dilatation, thromboses, and modification of the permeability of certain parenchymatous cells of the lungs leading to oedema and ultimately asphyxia. The primary actions of these gases may be followed by a broncho-pneumonia due to secondary invaders. CO causes an " anaemia anoxia " by combination with haemoglobin, displacing oxygen, while substances such as aniline, nitrobenzene, nitrophenols and arseniuretted hydrogen convert haemoglobin into methaemoglobin which lacks the capacity of oxygen combination. Under the influence of poison gases certain unidentified substances disintegrate from the lungs, diminishing the affinity of haemoglobin for oxygen.

Other effects of poison gases are capillary stasis, myocardiac injury and increase in the viscosity of the blood due to a large increase in the number of red cells caused by splenic contraction and hyperplasia of the bone-marrow. The utilization of oxygen may be affected by the influence of poison gases on oxidation catalysts in the tissues, especially non-colloidal catalysts. HCN inhibits the action of cytochrome and arsines inhibit that of glutathione, while CO under pressure combines with Warburg's respiratory ferment inactivating cellular oxidation.

—Alfred Eden.

PHYSIOLOGY.

Chiodi, V. (1937). Osservazioni sulla struttura del tratto terminale del coledoco negli animali domestici, con particolare riguardo allo sfintere di Oddi. [**Structure of the Bile Duct in Domestic Animals**].—*Clin. vet., Milano.* **60.** 303-321 and 381-398. 11 figs. [Numerous refs.]

A detailed study of the terminal part of the bile duct in domestic and laboratory animals has been made from an examination of circular and longitudinal serial sections. Structural differences, mainly in the character of the walls of the duct, were observed in the various species studied. These differences are seen chiefly in the fibro-muscular layer of the duct and are due to different arrangements of the muscle fibres.

The peripheral part of the fibro-muscular layer is composed almost entirely of connective tissue fibres which form a true peri-muscular membrane, tunica fibrosa propria. The muscle fibres are found in the deeper parts and reach their maximum development in the neighbourhood of the submucosa. They are usually grouped together, but may be isolated and are longitudinal in the upper part and circular in the deeper part of the layer. In the pig, cat and rabbit they are spiral. The elastic fibres are equally numerous in all animals. There may not always be a submucous layer distinct from the fibro-muscular layer and, except in the pig, there is no true muscularis mucosae ; in the horse, dog, and g. pig its remains can be seen as isolated bundles of muscle fibres.

The bile duct enters the duodenum at an obtuse angle and opens into the lumen of the intestine after a more or less prolonged course in the intestinal submucosa. The fibro-muscular layer increases in thickness at this site, due to an increase of muscle fibres. These arise from the longitudinal and circular muscle of the intestine and in all animals except the goat form a true sphincter. In the horse, dog, cat and fowl the sphincter is formed by muscle fibres which are separated by a septum of connective tissue from the fibro-muscular layer ; in the pig, ox, rabbit and g. pig the sphincter is formed simply by an increase of the muscle fibres of

the fibro-muscular layer. In both cases, since the fibres arise from the muscular layer of the intestine, presumably the activity of the sphincter is controlled by the intestine.—J. A. NICHOLSON.

DEL VECCHIO, C. (1937). Ricerche sul peso delle tiroidi e sul residuo secco tiroideo nelle bovine normali gravide e con corpo luteo persistente. [**The Thyroid Glands in Normal Cows and in those with Persistent Corpus Luteum**]. —*Nuova Vet.* **15.** 331-334. 3 tables. [1 ref.]

Great variations were found in the fresh weight of thyroid glands from non-pregnant, pregnant and sterile cows. The average weight in each class of animal was 17·23 g., 24·37 g. and 22·34 g. respectively. However, the dry weight calculated per 100 g. of the fresh gland was found to be very constant irrespective of the class of animal from which the gland had been taken, the average being 28·7 g.

It is concluded that a corpus luteum of pregnancy or a persistent corpus luteum causes hypertrophy of the thyroid gland.—J. A. NICHOLSON.

SCHMIED, W. (1937). Der Einfluss des Corpus luteum auf die Automatie des Rinder- und Pferdeuterus. [**Influence of Corpus luteum on the Bovine and Equine Uterus**].—*Wien. tierärztl. Mschr.* **24.** 540.

Corpus luteum extract was found to have no inhibitory action on the spontaneous movement of the isolated equine or bovine uterus.—G. HARTMANN (VIENNA).

I. FERRANDO, R. (1937). La sédimentation globulaire. Sa valeur chez les animaux de l'espèce bovine. Etude générale, comparative et critique. [**Red Blood Cell Sedimentation in Cattle**].—*Thesis, Lyons.* pp. 151. 1 table, 10 graphs. [Numerous refs.]

II. FERGUSON, L. C. (1937). **Studies on Bovine Blood. I. The Sedimentation Rate and Percentage Volume of Erythrocytes in Normal Blood.**—*J. Amer. vet. med. Ass.* **91.** 163-175. 2 figs., 4 tables. [Numerous refs.]

I. F. reviews the existing knowledge regarding red blood corpuscle sedimentation in the blood of man and animals. Details are given of the various methods employed in performing the test.

Several factors which might account for the slow rate of sedimentation in bovines are mentioned, including (a) the high viscosity of bovine blood, and (b) its greater capacity for agglutination as compared with the blood of animals of other species. Owing to the slow rate of sedimentation, F. considers the test in regard to bovine blood to be without significance and useless.

An increase in atmospheric pressure and in temperature is said to hasten sedimentation ; the rate is faster in the female, and also in old age : these factors should be taken into account in comparing results. Little difference was noted between samples taken before and after meals, and gestation appeared to have no influence. F. stresses the need for a standardized technique and terminology, and for further study of the mechanics of the phenomenon.

II. As a result of observations made on the blood of 22 cows over a period of three months, the mean sedimentation index of the herd was found to be 2·394 mm. (with a standard deviation of 0·275 mm.), whilst the mean percentage volume of erythrocytes was 31·32 (with a standard deviation of 2·194). In each case the calculations were based on the means for each individual.

The results were submitted to a statistical analysis which indicated that with regard to both sedimentation index and percentage volume there was a marked difference between separate animals as compared with that within individuals. The sedimentation rate is slower in cattle than it is in man, due, it is thought, to

the greater percentage of fibrin in the blood of bovines. The fact that the rate increases in certain diseases suggests that the sedimentation test and percentage volume determination may be of assistance in diagnosis.—H. V. HUGHES.

TECHNIQUE.

ROSENTHAL, L. (1937). **"Chromium-Sulphuric Acid" Method for Anaerobic Cultures.**—*J. Bact.* **34.** 317-320. [1 ref.]

This method utilizes the reactions between chromium and sulphuric acid to produce anaerobic conditions. Hydrogen is produced, displacing the air, and the chromous compound formed absorbs any residual oxygen. Results are said to be highly satisfactory.—P. S. WATTS.

TÓTH, S. (1933). Egyszerű festési eljárás a Negri-féle képletek gyors kimutatására. [**Simple Staining Process for Rapid Detection of Negri Bodies**].—*Közl. Oesszehas. élet- és kórtan Köréből.* **26.** 1-5. [9 refs.]

The following staining method is said to be excellent for Negri bodies. Smear preparations are stained for half a minute with half-strength carbol fuchsin and afterwards for one minute with half-strength Löffler methylene blue without heating.—G. SÁLYI (BUDAPEST).

LODENKÄMPER, H. (1937). Beitrag zur Technik der Herstellung von Kollodiumfiltern. [**Preparation of Collodion Filters**].—*Zlb. Bakt. I.* (Orig.). **139.** 214-224. 4 figs., 2 tables. [13 refs.]

A detailed account is given of the preparation of collodion membranes used in virus work, and L. stresses the importance of preparing the membranes under constant temperature and pressure. The calculation of the pore size of the membranes is explained, and is identical with that of ELFORD.—JAMES STEWART.

MUDD, S., SHAW, C. H., CZARNETSKY, E. J., & FLOSDORF, E. W. (1937). **A Low Temperature Ball Mill for the Liberation of Labile Cellular Products.**—*Publ. Hlth Rep., Wash.* **52.** 887-892. 2 figs. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 795. Signed G. S. WILSON].

It has been found that if bacteria are dried and cooled to a sufficiently low temperature they become brittle and can be easily disrupted by mechanical grinding. In practice the moist bacterial cells are introduced into a special grinding chamber made of monel metal and containing two large stainless steel balls. The chamber is lowered into a mixture of dry ice and methyl cellosolve, which produces a temperature of −80°C., and rotated till the organisms are frozen on to the periphery. The chamber is then attached to a miniature lyophile process condenser; the condenser is packed around with a mixture of dry ice and methyl cellosolve; and the entire system is evacuated by a high vacuum pump. When the organisms are completely dried, they can be ground in the ball mill, which rotates in the special freezing mixture just described, and their contents dissolved in saline. This method has been used for haemolytic streptococci, Johne's bacillus, and the tubercle bacillus. From tubercle bacilli grown on Long's medium the ground suspension, when filtered, had a protein content of 256 mgm. per litre. The method is stated to possess an advantage over the sonic disintegration method of CHAMBERS and FLOSDORF in that it results in the liberation of only soluble material; by the sonic method insoluble material goes into colloidal suspension—some of it in a form fine enough to pass through a Berkefeld N filter.

HARTLEY, P. (1936). **A Simple Laboratory Method for the Desiccation of Serum and other Protein Solutions.**—*Quart. Bull. Hlth Org. L. o. N.* **5.** 735-745. 2 figs., 1 table. [8 refs.]

By the method described 5 c.c. quantities of the sterile solution of antigen or antibody are delivered into ampoules by means of a precision burette, obviating the necessity for weighing out quantities of dry material. Desiccation is effected by exposure of the fluid in the ampoules to the action of phosphorous pentoxide *in vacuo*, in large glass desiccators, for a considerable period. Pure, dry nitrogen gas is then admitted to the desiccator and the ampoules are sealed off and stored continuously at −2° to −4°C. The dry products thus obtained dissolve fairly readily and yield solutions which differ but little in appearance from the original solution. Comparative tests have shown that little or no loss of specific activity occurs as a result of desiccation, and that the dry products are quite stable.

A method for the preparation of dry complement is also described. Pure sodium chloride is added to the fresh g. pig serum prior to desiccation, the serum is dried while in the frozen state and desiccation effected by means of phosphorus pentoxide as previously described.—R. ALLCROFT.

TAMURA, J. T., & BOYD, M. J. (1936). **Ketene ($CH_2 = CO$): A New Reagent for the Detoxification of Vaccine.**—*Science.* **83.** 61-62. 1 table. [4 refs.]

A non-toxic and effective vaccine for rabbits was made by submitting suspensions of *Bacillus dysenteriae* to ketene gas for 30 minutes. Living or heat-killed suspensions were highly lethal to controls.—J. E.

SCHÄFER, W. (1937). Ueber die Prüfung von Injektionsspritzen und die bei ihrer Anwendung auftretenden Fehler. II. Mitteilung. [**The Standardization for Volume of Injection Syringes. II**].—*Zlb. Bakt. I.* (*Orig.*). **139.** 205-214. 1 fig. [2 refs.]

This paper will be of interest to all those engaged in work necessitating the use of syringes, since it demonstrates with the help of rather advanced mathematics the accuracy to be expected from ordinarily calibrated syringes. The section dealing with the percentage error in various types of injection experiments due to the syringe itself is important, and S. suggests that this is usually insignificant. —JAMES STEWART.

JACOTOT, H., COLSON, M., & LE ROUX, G. (1936). La perforation du crâne au poinçon en vue des inoculations sous-dure-mériennes ou intracérébrales chez le chien. [**Intracranial Puncture with an Awl for Subdural or Intracerebral Inoculations**].—*Arch. Inst. Pasteur Indo-Chine.* **6.** 403-405. 1 fig.

For three years all dogs at the Pasteur Institute at Nhatrang have been inoculated intracranially by puncture of the skull through the temporal fossa with a special awl. The technique adopted is described. Simplicity and speed are claimed for the method, it being possible, with two assistants, to inoculate ten dogs in 20 minutes. The same method is applicable to other animals, with some variation of the inoculation site.—NORMAN HOLE.

FRENKEL, H. S. (1936). De compensograph. [**The Compensograph**].—*Versl. werkzaam. Staatsveearts. Onderzoek.-Inst. 1935.* pp. 19-21. 3 figs. on 2 plates. [English, French and German summaries].

For noting continuously the body temperature of mammals (ox and pig) in the course of experiments, F. advocates the Siemens compensograph. This is an apparatus which includes an electrical resistance-thermometer inserted into the rectum and a revolving drum system for recording the results.—C. B. (SCHIEDAM).

Barnard, J. E., & Welch, F. V. (1936). **Fluorescence Microscopy with High Powers.**—*J. R. micr. Soc.* **56.** 361-364. 1 text fig., 12 figs. on 1 plate. [1 ref.]

The methods of using ultra-violet light to obtain fluorescent images with high powers and dark-ground illumination are described and explained. For high-power work a light-source of high intensity is necessary, and for this a high-tension discharge between magnesium electrodes is used. Special quartz prisms, or hollow prisms with quartz sides, as well as quartz slides and cover-glasses are employed, and the material to be examined must be mounted in a non-fluorescent fluid such as distilled water or normal saline. A number of photomicrographs of bacilli taken in this manner are illustrated.—Norman Hole.

MISCELLANEOUS.

Great Britain. (1936). **British Pharmacopoeia Commission Reports of Committees. No. 10. Report of the Sub-Committee on the Accuracy of Biological Assays.** pp. 24. London: General Medical Council [8vo] [1s. 6d.]

An estimate has been made of the error involved in the biological methods described in the Addendum to the British Pharmacopoeia, 1932 (published in 1936), for the assay of vitamins A, B, C, and D, of staphylococcus, *Vibrion septique* and *Clostridium oedematiens* antitoxins, and of antipneumococcus serum. The error in each case is expressed as " limits of error ", based on the arbitrary convention that a probability of 0·99 (P = 0·99) is equivalent to certainty. Statements on " limits of error " proposed for insertion in the Addendum, are given in respect of each of the biological assays mentioned.—N. J. Scorgie.

I. Berger, H. C. L. E. (1937). Het veeartsenijkundig staatstoezicht in de laatste 25 jaar. **[The State Veterinary Inspection Service, Holland].**—*Tijdschr. Diergeneesk.* **64.** 1109-1117.

II. Berger, H. C. L. E. (1937). De Rijksseruminrichting. **[The State Serum Institute, Holland].**—*Ibid.* 1118-1125. 2 photographs.

III. Berger, H. C. L. E. (1937). Het Staatsveeartsenijkundig Onderzoekingsinstituut. **[The State Veterinary Research Institute, Holland].**—*Ibid.* 1126-1129. [Numerous refs.]

IV. Veenbaas, A. H. (1937). Gezondheidsdiensten voor vee. **[Health Services for Livestock in Holland].**—*Ibid.* 1141-1147. 2 figs.

I. A synopsis of the development of the State Veterinary Service during the past 25 years. Foot and mouth disease has been one of the principal problems to contend with; the slaughter-system of eradication had to be abandoned after the Great War owing to the farmers' antagonism. In 1919 the Meat Inspection Act was brought into force and in 1922 a new " Cattle Act " in which *inter alia* are given instructions for combating bovine TB., the control of meat and meat products for export, the import of bone and meat meal, and the import and transport of poultry, etc. Since 1925 the administration of both these Acts has been centralized in the hands of the Director of the Veterinary Service and his staff of inspectors. A revision of the Cattle Act 1922 for regulating questions such as the use of antisera and vaccines, controlling poultry diseases, etc., is in the course of preparation.

II. As a result of Poels' report on pig diseases (1899) the State Serum Institute was established at Rotterdam in 1904 for introducing scientific methods, especially with regard to infectious animal diseases and analysis of milk and water,

examination of quack medicines, etc. The Institute, which began in 1904 with the regular preparation of some five biological products now issues 63 kinds (output in 1935—3,644 kg.) It is self-supporting and sells its products to the practitioners at low prices, whilst diagnostic investigations are carried out free of cost. In 1933 the Institute moved into new, modern buildings.

III. The State Veterinary Research Institute was established at Rotterdam in 1929 to study the foot and mouth disease problem and to prepare immune serum for use in Holland. It is temporarily housed in a few rooms of the State Serum Institute though it is intended to remove it to a more isolated place. Methods of cultivating the virus on explants of embryonic skin of cattle, sheep and pigs have been worked out successfully.

IV. In the Province of Friesland, so well known for its valuable cattle, a Provincial Health Service for livestock was established in 1908 by co-operation of the Friesian Herdbook Society and the association of co-operative dairy-factories.

The service carries out regulations for combating stock-diseases and improving the hygienic conditions, and for the examination of milk and milk products, and runs a laboratory under veterinary direction. The work has led to great success in the eradication of TB., infertility in cattle, contagious abortion and the improvement of milk hygiene. The average percentage of TB. in herds under permanent control was reduced in 14 years from 34 to 8.—C. B. (SCHIEDAM).

ANON. (1936). Regulamento do Serviço de Defesa Sanitaria Animal. [**Regulations for the Animal Health Service, Brazil**]. pp. 14. Rio de Janeiro: Directoria de Estatistica da Produção.

A series of new regulations has been made concerning the import of animals and animal products into Brazil. The inspection of animals is carried out by veterinarians, instructions for whom are detailed. The importation of animals is totally prohibited from countries where trypanosomiasis, contagious bovine pleuro-pneumonia, rinderpest, heartwater or swine fever are enzootic.

An animal diseases council has been set up to superintend this work in general. —S. TORRES.

ANON. (1936). Escola fluminense de medicina veterinaria. [**A New Veterinary College at Rio de Janeiro**].—*Folha vet., Brasil.* **1.** 84-87.

This new college at Nictheroy is now in full session under the direction of Professor Americo BRAGA. Nictheroy, in the vicinity of Rio de Janeiro, is already a great university centre and with the addition of the veterinary college can vie with other civilized countries in educational facilities.—W. L. MARSHALL.

ANON. (1937). L'Istituto Vaccinogeno Zooprofilattico di Addis Abeba. [**The Veterinary Institute at Addis Ababa**].—*Azione vet.* **6.** 765-767. 6 figs.

The Italian Government had for a long time maintained separate Veterinary Institutes for Eritrea and Somaliland; the decision to start another at Addis Ababa was taken immediately after the occupation of that country. The Institute has been located for the present in existing buildings not designed for the work; illustrations of them are given. Stress is laid on the fact that an entirely isolated building is devoted to the preparation of anti-rinderpest serum. A small laboratory is being prepared for experiments in artificial insemination for the improvement of the breeds of cattle, and especially of sheep. There is a note on the difficulties in training locally enlisted labour. In six months the Institute has produced 7,000 doses of anti-rinderpest serum, and distributed 226,595 doses of smallpox

vaccine and 20 doses of antirabies vaccine. The officers employed at the Institute are also charged with the inspection of meat at the abattoirs.—S. F. J. Hodgman.

Oosthuizen, M. J., & Smit, B. (1936). **Electrocuting Insects.** —*Fmg S. Afr.* **11.** 103-104 and 131. 3 figs.

This is a description of a fly trap introduced a few years ago in America and recently in South Africa. The principle is the electrification of a wire grating which results in the electrocution of flies or other insects which attempt to pass it. It can be arranged round a light or some attractive food bait. The wires are one quarter of an inch apart and the current used (18 milliampères) is harmless to human beings.—E. M. Robinson.

OFFICIAL AND OTHER REPORTS.

Great Britain. (1937). **Veterinary Laboratory, Weybridge. Report of the Director to the Chief Veterinary Officer for 1936.** [Andrews, W. H.]—*Proc. Dis. Anim. Lond., 1936.* pp. 69-73.

The main activities of the Laboratory are dealt with under two headings, *viz* :–

(1) Routine Services.—The following specimens were received for the purposes of diagnosis in suspected cases of the diseases dealt with under the Diseases of Animals Act :– Swine Fever 4,379 (1,972 positive, 2,407 negative) ; Anthrax 700 (528 positive, 172 negative) ; Sheep Scab 44 (31 positive, 13 negative), and Rabies 5 (all negative). In addition, 5,285 specimens were examined which were not suspected of being connected with any of the scheduled diseases.

During the year 22,269 doses of anti-abortion "A" vaccine were supplied and 1,224 agglutination tests carried out in connexion with bovine abortion. 392 doses of BCG vaccine were issued for use in selected herds. Fowl Pox vaccine was issued for the inoculation of 264,861 poultry and 164,126 agglutination tests were conducted for *Salmonella pullorum* infection. 20,807 doses of Avian Typhoid vaccine were supplied. Two cattle were immunized against Piroplasmosis and Anaplasmosis.

(2) Research.—The investigation on the significance of the agglutination titre of the blood in relation to the presence of *Brucella abortus* in the milk was continued and a report published [see *V. B.* **8.** 272]. New work included an investigation of the occurrence and distribution of the organism in the bodies of cows which had showed blood agglutinins in low titre.

Research into infection of bovines with the avian type of *Mycobact. tuberculosis*, and on so-called " skin tuberculosis " was carried out.

Other investigations included work on the resistance of the Swine Fever virus and on Parasitic Gastritis of sheep.

The biochemistry section dealt with metabolic disorders of farm animals.

The poultry section continued work on infectious Laryngotracheitis and Syngamiasis and considered the pathogenicity of poultry parasites in relation to nutrition.—J. C. Wallace.

Great Britain. (1937). **Statistical and General Report, Army Veterinary Services, 1936-37.** [Tapley, J. B.] pp. 24. 11 tables. London : The War Office. [8vo].

The average strength of horses in the United Kingdom throughout the year was 9,812 ; of these the daily number under treatment was 4·88 % and the average time under treatment was 21·75 days. The wastage on account of disease was

7·15% of the average strength and the wastage for other causes 28·36%. The average age was 11·31 years. The corresponding figures for horses in Egypt were :– 1,152 ; 8·43% ; 30·94 days ; 9·35% ; 40·88% ; 12·8 years, and for mules in Egypt :– 250 ; 5·87% ; 32·45 days ; 5·6% ; 50·4% ; 12·68 years. The general health and condition were good.

At the Army Veterinary School instruction was given to four officers and 33 other ranks. The amount of routine work in the laboratory maintained its normal level. The demand for radiological examinations increased. The average daily number of pupils at the School of Farriery was 10·8 and the average period taken to qualify was 6·2 months.—G. WILLIAMSON.

INDIA. (1937). **Annual Administration Report of the Army Veterinary Service in India for 1936-37.** [DIBBEN, H. C.] pp. 41. Numerous tables. Simla : Govt. India Press. [8vo].

The establishment consisted of 62 British officers, 15 Indian commissioned officers, 124 veterinary assistant surgeons and 699 Indian other ranks, with a reserve of 77 of the latter. In 1936 there were three candidates, two of whom were successful, for four commissions for Indian Officers. 233 pupils attended the two schools. A laboratory was opened in Lahore in October. The number of hospitals was 70.

The animal strength was :– horses 32,104 ; mules 28,502 ; camels 3,868 ; cattle 11,542, and donkeys 162. The health of 14,427 other horses is under indirect supervision. The commonest diseases of a non-specific nature were :– " accidents and disabilities ", 24,753 cases ; surgical conditions, 6,468 cases, and digestive disorders, 5,146 cases. The commonest specific diseases were :– STRANGLES, INFLUENZA, FOOT AND MOUTH DISEASE and TRYPANOSOMIASIS of which the respective numbers affected were 1,808, 1,077, 935 and 453. Short but valuable notes concerning significant aspects of outbreaks of the following diseases fill the main body of the report :– anthrax, bovine and equine contagious abortion, equine encephalomyelitis, foot and mouth disease, joint-ill, influenza affecting both horse and camel, piroplasmosis, equine contagious pneumonia, rabies (4 horses, 2 mules, 1 donkey, 6 cattle), rinderpest, strangles, tetanus, theileriasis, tuberculosis and equine variola.—G. WILLIAMSON.

SOUTHERN RHODESIA. (1937). **Report of the Chief Veterinary Surgeon for the Year 1936.** [SHARPE, G. C. H.] pp. 14. Salisbury : Rhodesian Printing & Publishing Co., Ltd. [fcp].

STAFF.—The staff was reorganized during the year. There were 13 veterinary surgeons and 72 cattle inspectors.

INFECTIOUS DISEASES.—The country was again free from RINDERPEST, CONTAGIOUS BOVINE PLEURO-PNEUMONIA, SWINE FEVER, RABIES, GLANDERS and DOURINE, although all are more or less prevalent in one or more of the surrounding territories. The most important diseases dealt with were FOOT AND MOUTH DISEASE and EAST COAST FEVER. The former reappeared after the country had been free for about eight months, infection coming, apparently, from certain low veldt areas in the Victoria District and it is stated that all outbreaks since the initial one in 1931 have arisen from movements of cattle from this area. It is suggested that some reservoir of infection exists here, probably in the form of " carriers ". The spread of the disease was checked by inoculation of all in-contacts and by drastic measures of segregation and the prohibition of movement within affected areas for a period of not less than six months. Over 21,000 cattle were involved.

East Coast Fever broke out in many districts, one of which had been free for nine years. Besides the usual *Theileria parva* and *Th. mutans* infections a different form of theileriasis occurred, referred to as " specific disease ". The necessity for intensive dipping is emphasized.

Anthrax occurred in three districts, causing only four deaths ; in-contacts were immunized. Heartwater caused heavy losses in some districts, and measures to control the bont tick are urged in order to prevent the spread of the disease to areas hitherto free. Horse-Sickness caused higher mortality than during the previous year, 30 deaths being reported, chiefly among uninoculated animals. Over 1,000 horses were immunized with a neurotropic mouse brain virus. Out of over 98,000 cattle slaughtered, 12 beef carcasses were condemned for Tuberculosis in two large abattoirs belonging to private firms.—F. J. Andrews.

Southern Rhodesia (1937). **Report of the Director of Veterinary Research for the Year 1936.** [Lawrence, D. A.] pp. 12. Salisbury : Rhodesian Printing & Publishing Co., Ltd. [fcp].

Research was hampered by lack of professional assistance during most of the year.

Cases of infection with *Theileria parva* and *Th. mutans* were encountered, but the year was notable for the occurrence of a theileriasis referred to as " specific disease " differing from both these infections and from those due to *Th. dispar* and *Th. annulata* met with in South Africa. It is tick-borne, and usually fatal within a week. The lesions found P.M. differ from those of East Coast Fever. Koch's bodies were demonstrable in spleen and gland smears, and in many blood smears, and a single small piroplasm could occasionally be found in blood smears. Infarcts were not present in the kidney. Attempts to transmit the disease failed. Calves and imported bulls were inoculated with an *Anaplasma centrale* vaccine as it has been found that this vaccine, which causes only a mild reaction, protects against *A. marginale*. Good results are claimed in the control of Foot and Mouth Disease by the immunization of all animals in an infected area by intramucosal inoculation of vesicle fluid in glycerin-saline. Over 1,000 horses were immunized against African Horse-Sickness with the Onderstepoort neurotropic vaccine. Heartwater was diagnosed in imported goats, and was transmitted by intravenous inoculation of citrated blood to two sheep, intima smears from which showed large numbers of rickettsia. Previous attempts to transmit the disease and demonstrate rickettsia has been unsatisfactory.—F. J. Andrews.

Southern Rhodesia. (1937). **Division of Entomology, Annual Report for the Year 1936.** [Jack, R. W.]—*Bull. Minist. agric. S. Rhod.* No. 1037. pp. 23. 1 table. [Reprinted from *Rhod. agric. J.* **34.** 570-592].

Of chief interest from the veterinary point of view is the section dealing with work on the tsetse fly. Further large areas in the country have been freed from permanent " fly ". The discovery of the advance of *Glossina morsitans* through Portuguese territory towards the low-lying Sabi valley causes great anxiety.—F. J. A.

Northern Rhodesia. (1937). **Annual Report of Government Veterinary Department for the Year 1936.** [Morris, J. P. A.] pp. 76. Numerous tables, 4 appendixes. Lusaka : Govt. Printer. [fcp] [2s. 6d.]

Staff.—Work in the field and in the research institute is seriously handicapped by the lack of staff.

Infectious Diseases.—Sixteen outbreaks of Anthrax were reported as against six the previous year ; many were controlled by quarantine and inoculation, but

in Barotse Province the disease is uncontrolled, the mortality is high, and human beings frequently contract the disease, usually from hides used for clothing and bedding. TUBERCULOSIS is only occasionally seen during meat inspection. GLANDERS has not occurred in the country since 1928. CONTAGIOUS ABORTION is enzootic throughout the territory. Thirty-eight outbreaks were dealt with by segregation, disinfection, etc. Vaccine from the Union of South Africa is favourably reported on. Forty-seven outbreaks of BLACKLEG were controlled by segregation and vaccination. The immunization of calves as they begin to nibble grass and again at one year old is recommended.

TRYPANOSOMIASIS is enzootic over a large area, five-eighths of the country being infested with tsetse fly. *Trypanosoma vivax* and *Tryp. congolense* are the usual parasites. Mechanical transmission by *Stomoxys* and Tabanidae appears to play a large part in the spread of infection; potassium antimony tartrate is given, naganol being considered too expensive for general use. The country is free from EAST COAST FEVER. ANAPLASMOSIS is enzootic and the vaccine from Onderstepoort does not confer immunity against the Northern Rhodesian strain, as is also the case with PIROPLASMOSIS vaccine. Short-interval dipping is recommended. Acaprin is reported to have given good results in the treatment of PIROPLASMOSIS.

AFRICAN HORSE-SICKNESS is controlled among the few (130) horses in the territory by immunization with neurotropic vaccine from Onderstepoort. The country has been free from RINDERPEST since the end of the last century. FOOT AND MOUTH DISEASE was eradicated in January, 1936 from the last remaining focus of infection, where 67,000 cattle were inoculated by the intramucosal method. CONTAGIOUS BOVINE PLEURO-PNEUMONIA is confined to the Barotse Province, and a vigorous campaign for its eradication was started during the year. There were 84 outbreaks of HEARTWATER, some very serious, compared with 55 in the previous year and 127 in 1934; short-interval dipping is recommended. RABIES appears to be on the increase, but lack of funds prevents effective measures being undertaken for the control of the disease.—F. J. ANDREWS.

NORTHERN RHODESIA. (1937). **Annual Report of the Research Section of the Veterinary Department, 1936.** [LE ROUX, P. L.]—*Rep. Dep. Vet. N. Rhod. 1936.* pp. 46-70. 5 tables.

Routine examination of smears and specimens greatly increased, and research work was seriously handicapped by lack of staff. The efficacy of dipping cattle in reducing the numbers of disease-transmitting ticks is noted, but the necessity for the regular dipping of all cattle in an arsenical solution of correct strength is emphasized. For the control of TRYPANOSOMIASIS a campaign for the shooting and poisoning of wild pigs is urged. " Antimosan " was found a good prophylactic by some owners, and infected cattle derived benefit from fortnightly injections. " Surfen C " was tested on a few animals, but produced very severe reactions. HELMINTHIASIS and HEARTWATER are responsible for the most serious losses in sheep. Good pasture and dosing with appropriate agents are recommended for the former and the regular dipping of animals—particularly cattle, for the purpose of eliminating the vector tick, and so protecting the sheep—for the latter [see also p. 437]. In the poultry industry losses from FOWL TYPHOID and FOWL POX are not so common since the introduction of immunization with vaccine from the Union of South Africa.—F. J. ANDREWS.

NORTHERN RHODESIA. (1937). **Report of Officer in Charge of Veterinary Experimental Station, Machili, 1936.** [PURCHASE, H. S.]—*Rep. vet. Dep. N. Rhod. 1936.* pp. 42-45. 2 tables.

Experiments were conducted to test the effect of pleuro-pneumonia vaccine supplied by the Veterinary Research Laboratory, Kabete, Kenya, on adult and young cattle when injected (a) into the tail (subcut.) and (b) intramuscularly. No severe reactions occurred. Immunity produced against a local strain of virus is to be tested later.

Cattle infected, apparently, with *Trypanosoma vivax* and *Tryp. congolense* received 100 c.c. per 100 lb. body weight of a 2·5% solution of "Surfen C". When injected (intraven.) it produced very severe reactions; when injected (intramusc.) it caused no inconvenience to animals.

In 33 animals surviving treatment, no trypanosomes were demonstrable in smears a fortnight after inoculation, and all were fit for work a month later.

—F. J. Andrews.

Kenya. (1937). [**Report of**] **Division of Animal Industry [Kenya, 1936].** [Brassey-Edwards, H. H.]—*Rep. Dep. Agric., Kenya.* **1.** 114-175. Numerous tables.

Staff.

There were the Chief Veterinary Officer, one senior Veterinary Officer, ten Veterinary Officers, five Instructors in Stock, and 13 Stock Inspectors.

Animal Diseases.

Settled Areas.—There were 44 outbreaks of Rinderpest, mostly in the Nairobi district. The various methods of immunization are briefly described. 53,662 cattle were given serum plus virus, 352 serum alone, 10,616 vaccine plus virus and 413 vaccine alone.

There were 22 outbreaks of Anthrax, 8 of Haemorrhagic Septicaemia, 17 of Bovine Brucellosis, 255 of Blackleg, 5 of Trypanosomiasis, 146 of East Coast Fever, 58 of Foot and Mouth Disease, 52 of Horse-Sickness, and 4 of Swine Fever. No case of Contagious Bovine Pleuro-Pneumonia occurred. Rabies was diagnosed only in 4 jackals, and 6 cases of Ulcerative Lymphangitis were observed. Tables give the incidence of the most important diseases in the 6 settled areas.

Native Reserves.—The Rinderpest situation is described. 43,534 cattle were immunized with serum plus virus, 200 with vaccine plus virus and 3,815 with vaccine alone. Anthrax and Blackleg were prevalent in all parts, and 1,276 cattle were treated for Trypanosomiasis by native veterinary staff. E.C.F. is endemic in some parts of the native reserves and no attempt is made to control it by dipping, as elsewhere. Calves acquire a good immunity naturally. F. & M. Disease appeared here and there, causing slight loss only. C.B.Pl.Pn. was under control and it is hoped to eradicate it in due course; 138,954 cattle were immunized against the disease during the year.

Education.

Five African Veterinary Training Centres are in existence where natives are given courses of instruction in animal husbandry and disease control: the longest course extends over three years and satisfactory students are taken on to the staff.

—J. E.

Kenya. (1937). **Report of the Chief Veterinary Research Officer.** [Daubney, R.] —*Rep. Dep. Agric., Kenya, 1936.* **2.** 55-89. 7 tables.

Staff.

In addition to the Chief Veterinary Research Officer there were three Research Officers, one Entomologist and 20 assistants, etc.

Routine Work.

The results of diagnostic work are given in tabular form. 164,985 units of Rinderpest antiserum were prepared during the year, also large amounts of other biological products, details of which are given.

Research.

With regard to Rinderpest, the year's research was devoted to attempts at attenuating the virus for immunization purposes.

"The object of the first series of experiments was to ascertain if rinderpest virus could be fixed as a neurotropic virus in any suitable domestic animal. Various methods were used in attempts to introduce the virus to multiply in brain tissue. Mice were inoculated intracerebrally with mixtures of rinderpest virus and Rift Valley neurotropic virus, in the hope that the injury caused to nerve cells by the Rift Valley neuro-virus, and the infiltration of vessels with mesodermal cells might together supply conditions favouring the multiplication of the rinderpest virus. The procedure was varied by making use of an " O " strain of horse sickness neuro-virus which usually takes 6 days to kill mice, and inoculating the rinderpest virus intracerebrally 3 days after the horse sickness virus. In only one instance was rinderpest virus recovered from the brains of inoculated mice 4 days after inoculation, this was in the first passage and the virus failed to survive a second inoculation period of the same length."

Similar results were obtained with rabbits, so the experiment was abandoned. The virus was passaged through a long series of goats, and by the 83rd passage had undergone a definite degree of attenuation for bovines. The lesions in the goats are described.

Research was continued on Malignant Bovine Catarrh [see *V. B.* **7.** 21.] and the recent results will be published in a scientific periodical. It was observed that M.B.C. could modify the course of East Coast Fever in cattle, and it was thought that Turning Sickness (" muthioko ") might be the natural manifestation of this observation. To test this theory two cows recovered from E.C.F. were infected with M.B.C. virus and both died of M.B.C. It is stated that Turning Sickness is cerebral E.C.F. in an immune animal. In both of the above cows Koch's bodies were found in the brain P.M. : they must either have survived in the body for 10 and 24 months respectively after the animals had recovered from E.C.F. or else been due to reinfestation by " carrier " ticks at a later date.

A new disease of cattle is described under the name of " Specific Transmissible Petechial Fever ". It has been found in widely separated districts and may cause a mortality of 20%. It causes a sudden and striking drop in milk yield and recovery is slow.

" Other symptoms are a high fever, and often swollen glands. In acute cases examination of the tongue reveals the presence of numerous small haemorrhages under the tip and along the sides of this organ. Very often an animal will look quite well one day and be found dead the next morning.

Post-mortem examination reveals extensive subcutaneous, submucous and subserous haemorrhages. The most striking lesion is an extensive subendocardial haemorrhagic infiltration in the left ventricle of the heart. The mucous membrane of the stomach and intestines shows multiple small haemorrhages, and in fact practically every organ in the body is similarly affected. The mucous membrane of the bladder is covered with petechial haemorrhages.

Mr. Danks has succeeded in transmitting the disease by blood inoculations. For the original transmissions large quantities of blood were used, but later it was found that a dose as low as 0·2 c.c. blood was capable of producing a typical reaction. Serial transmission has been carried through sixteen animals, with a noticeable decrease in mortality in the later passages ".

Appropriate tests to demonstrate the presence of bacteria or protozoa or a filtrable virus were all negative. Small laboratory animals were found to be resistant to blood inoculation, whilst calves, sheep and dogs merely showed fever without any mortality.

Two pigs died of PIROPLASMOSIS, the parasite being identified as *Piroplasma trautmanni* du Toit.

Research on ticks of Kenya continued ; seven species of *Hyalomma* have been observed and one of them, *H. impressum* near *planum*, has been proved capable of transmitting E.C.F. as well as *Rhipicephalus appendiculatus*. Batches of both these ticks infected in the nymph stage and allowed to moult were subjected to various temperatures for various periods and were found capable of transmitting E.C.F. after being kept at 4°-6°C. for as long as 21 days.

A strain of *Theileria dispar* was obtained from Algeria and was transmitted successfully among cattle by *H.i.* near *p.*, but not by *Rh.a.* No evidence of cross-immunity between *Th.d.* infection and E.C.F. was obtained.

Results of a tsetse fly survey in various parts of Kenya are given. The value of new drugs against *Trypanosoma congolense* infection in cattle was tested. " Surfen C ", antimosan and F [Fourneau] 995 were alone found to be of value.

Particulars of a sheep dipping trial (for sheep scab) are given, but the results are not yet complete.

Notes are also given on MASTITIS in cows, BOVINE BRUCELLOSIS, ENTEROTOXAEMIA in sheep, calf diseases and " Nakuruitis ".—J. E.

KENYA. (1937). **[Work at] Experimental Station Laboratory [Naiwasha] [Veterinary Research Division, Kenya, 1936].** [ANDERSON, J.]—*Rep. Dep. Agric. Kenya, 1936.* **2.** 89-97. 4 tables.

Much work was carried out on sexual physiology of cattle and sheep. Details are also given on the breeding records of the station herds.

Research on ovulation of merino, Masai and Blackhead Persian ewes indicated that oestrus lasts for 6-48 hours and that ovulation occurred not earlier than 27½ hours after the beginning of oestrus. Similar work on zebu cows was recorded elsewhere [*V. B.* **8.** 255]. Artificial insemination was carried out on large numbers of cattle and sheep, the percentage of pregnancies so obtained in cattle being about the same as that from normal service, but in sheep the results were not so good.

An equine pregnancy diagnosis service has been started.—J. E.

AFRICA, BASUTOLAND. (1937). **[Report of] Veterinary and Livestock Division 1935-1936].** [HENDERSON, G. T.]—*Rep. Dep. Agric. Basutoland, 1936.* pp. 45-65. 6 tables.

STAFF AND FINANCE.—There are one Principal Veterinary Officer, one European clerk, 8 sheep inspectors, two lay assistants, and 90 inspectors, supervisors, etc. The total veterinary vote for the year amounted to £20,179. Numbers of stock had increased since the previous year by about 15% to 414,872.

A list of diseases prevalent in the country is given for each class of animal ; none assumed disturbing proportions during the year.

ANTHRAX is controlled by the annual (or in some cases biennial) inoculation of all cattle in the Territory with spore vaccine, supplied by the South African Government.

As in most African territories HELMINTHIASIS is very prevalent ; the following is quoted :–

" HELMINTHIASIS. Almost every conceivable variety of helminth is to be found in Livestock in Basutoland. Fortunately, in the case of sheep and goats the compulsory monthly dosing scheme is gradually eliminating those internal parasites belonging to the . . . helminths ".

A section of the report is devoted to " Measures to bring about improvement of livestock ". These include a comprehensive list of activities, legislative and otherwise.—R. N. FIENNES.

I. Bechuanaland. (1935). **Veterinary Report for 1935.** [Hobday, J. H. N.] pp. 4. [Typescript] [fcp].

II. Bechuanaland. (1936). **Veterinary Report for 1936.** [Hobday, J. H. N.] pp. 8. [Typescript] [fcp].

I. There were five Veterinary Officers, and 15 Stock Inspectors, supported by native assistants. Staff were largely concerned with enforcing regulations in connexion with the stock export trade.

Anthrax and Blackleg were dealt with by inoculation. For Trypanosomiasis, tartar emetic was used for treatment with success, and investigations of methods of tsetse fly control were continued. Previous encroachments of tsetse fly were followed during the year by a recession. Foot and Mouth Disease, following on the 1934 outbreak, was eradicated before the start of the year, but staff were still kept fully occupied with inspection work in connexion with it. No reports of tick borne diseases were received during the year. 10,100 doses of wire-worm remedy were distributed.

II. The Staff was the same as in 1935. Trypanosomiasis was confined to the N'gamiland district. The tsetse fly is thought to be spreading, but other "biting flies" are also blamed for mechanical transmission of this disease. East Coast Fever was absent, but the authorities are alive to the danger of its introduction, and measures to control the movement of cattle are being taken in concert with the authorities in Southern Rhodesia, where the disease occurs close to the border.

F.M. Disease was absent, but precautions were continued, and new regulations introduced. The presence of Contagious Bovine Pleuro-Pneumonia in South West Africa led to the strengthening of the Caprivi Strip Border Patrol. Heartwater is a major problem and seven outbreaks caused heavy mortality amongst N'gamiland cattle. An outbreak of Rabies, which resulted in the death of one native child, was effectively dealt with by destruction of dogs to form "dog-free" belts. Over two thousand dogs were destroyed.

Verminous infestation is said to be widespread throughout the Protectorate, but attracts little attention.—R. N. Fiennes.

Colony of Mauritius. (1935). [**Report of**] **Veterinary Division.** [Lionnet, F. E.]—*Rep. Dep. Agric. Mauritius, 1935.* pp. 28-30.

Animal Diseases.—The use of BCG vaccine has steadily increased during the last few years; over 1,600 doses were used during 1935. It is said to have contributed greatly to the improvement of herds.

Trypanosoma evansi was detected in two horses and 31 cattle, and over 100 cattle were infected with *Tryp. vivax*. Naganol was used for horses and tartar emetic for cattle. The order for the destruction of equines for Surra under the Animal Ordinance was cancelled.—F. J. Andrews.

Hong Kong. (1937). **Annual Report of the Colonial Veterinary Surgeon for the Year 1936.** [Mackenzie, W. J. E.] pp. 5. 1 table. Stanley: Govt. Printer. [8vo].

Infectious Diseases in the Colony.—Anthrax and Rabies alone are mentioned. Over 300 dogs and a few monkeys and cats were placed under observation for Rabies (the large majority being negative), and only one brain out of 17 examined proved positive for Rabies. There were three cases of Anthrax. In the quarantine, through which 148 horses, 71 cattle and 50 dogs passed, there were 8 cases of Anthrax.

It is stated that 27,000 lb. of diseased meat (condemned carcasses, etc.) and 450 animals were destroyed in the crematorium.

Diseases in Depots.—A list of 180 cases of disease in animals is given: it includes Anthrax, Tuberculosis, Foot and Mouth Disease, Anaplasmosis, Swine Fever, injuries, etc., in cattle, sheep, goats and swine. Presumably these were animals imported for slaughter.—F. J. Andrews.

Holland. (1937). Verslag van den veterinair hoofdinspecteur van de volksgezondheid, belfast met het toezicht op de naleving van de vleeschkeuringswet, staatsblad 1919, No. 524, over het jaar 1936. [**Holland: Report of the Chief Veterinary Public Health Inspector for 1936**].—[Berger, H. C. L. E.] pp. 82. Numerous tables.

There was a decline in the number of cattle, horses and sheep slaughtered owing to the restriction of breeding and the unfavourable economic conditions. The method of electrical stunning is still under investigation. The great majority of municipalities are now affiliated with one of the destructor-plants for utilizing condemned carcasses and offal. The percentage of cases of Cysticercosis in adult cattle ran in different districts from 0·29-2·13%, that of Echinococcosis (15% for cattle in Friesland in 1926) to 4·52% in that Province in 1936; the percentage of Tuberculosis in cattle for the whole country rose from 18·58 in 1935 to 20·69, but decreased for pigs from 5·73 to 5·32. Two cases of food poisoning were observed, one through consumption of pork contaminated with *Salmonella enteritidis*, the other through salmonella-infected duck-eggs. The *ante-mortem* examination of slaughter cattle proved again to be a very useful addition to the meat inspection process.—C. Bubberman (Schiedam).

I. Egypt, Cairo. (1937). **Ministry of Agriculture. Veterinary Service, Annual Report 1932-1933.** [Farid, A.] pp. vi + 288. Numerous tables. Bulâq, Cairo: Govt. Press. [8vo] [P.T.5].

II. Egypt. (1937). **Report of Veterinary Pathological Laboratory, 1932-1933.** [Carpano, M.]—*Rep. vet. Serv. Egypt. 1932-1933.* pp. 15-36. 10 tables.

III. Egypt. (1937). **Pretoria Agricultural Veterinary Congress of the African Nation.** [Carpano, M.]—*Ibid.* pp. 46-55.

IV. Egypt. (1937). **Annual Report of the Serums Institute of the Veterinary Service, Cairo, for 1932-1933.** [Guindi, M.]—*Ibid.* pp. 150-190. 42 tables.

I. A staff list indicating the duties of each individual is given. The reports of the Directors of the Veterinary Laboratory and of the Serum Institute are dealt with below. Information relative to veterinary legal cases, the isolation hospital at Abassiya and the Remount Department are given in tabular form. The report suffers considerably from indifferent phraseology, which at times makes the exact meaning of the writer difficult to interpret.

Diseases.—No cases of Rinderpest were recorded. About 35,000 cattle were inoculated by the serum-virus or serum-alone methods. Foot and Mouth Disease was detected in a consignment of Sudanese cattle, in sheep from Istanbul and in 11 pigs at the Cairo abattoir. Haemorrhagic Septicaemia was prevalent. 3,402 animals were inoculated with vaccine and 245 with serum alone. 41 cases of Anthrax, 3 cases of Malta Fever and 8 cases of Bursattee were reported. Two cases of Contagious Bovine Pleuro-Pneumonia were detected in cattle imported from the Sudan. 87 cases of Coccidiosis were recorded, but the species of animal is not indicated. Piroplasmosis was prevalent. Glanders and Mange, the latter presumably in equines, were also reported. 34 cases of Rabies were recorded; an intensive campaign of slaughter of stray dogs and cats is being carried out to aid in its control. Sheep Pox was wide-spread. 13,743 sheep were inoculated against the disease. Trypanosomiasis [presumably in camels], 4,739

cases of TUBERCULOSIS [presumably in bovines], STRANGLES, STIFF SICKNESS and TETANUS were amongst the other diseases reported. Poultry diseases were important causes of loss.

II. The results of routine examinations on 4,213 specimens are given in tabular form. 208 specimens of vaccines and sera mostly against RINDERPEST and H.S. were tested for potency and sterility. Details are given of the field work including inoculation of various vaccines and sera against ANTHRAX, H.S., FOWL CHOLERA, FOWL POX and SHEEP POX, and P.M. examinations carried out by the staff. A list of the biological products prepared is given.

Research was carried out on FOWL PLAGUE, PIROPLASMOSIS of geese and corynebacterial infections in camels.

Detailed instructions are given for the tuberculin testing of animals in Egypt. The subcutaneous test is considered to be the most reliable.

III. A note to the Ministry of Agriculture, Union of South Africa giving assurances of Egypt's co-operation in dealing with animal diseases according to the recommendations of the above Congress. A brief outline is given of the diseases met with in Egypt, and the methods of control and eradication adopted. The activities of the Egyptian Ministry in veterinary education, animal breeding and milk production are also outlined.

IV. The principal activities of the Institute are the preparation of RINDERPEST serum, H.S. serum, FOWL CHOLERA, antistreptococcus and antitetanus serum, the testing with mallein of animals purchased for government services [exact meaning not clear], and the supervising of general stores for the veterinary service.

Cyprus and Balady bulls are used for RINDERPEST serum production. Numerous tables are given relative to animals used as virus producers for hyperimmunization, disposal of meat after inspection, and bleeding for serum. The dose of serum is 50 c.c. and 73,491 doses were produced. An account is given of the hyperimmunization and serum testing relative to anti-rinderpest serum production. Several batches of sera over two years old were found to have retained a satisfactory potency. Some of the administrative details and expenditure are given in tabular form.—F. H. MANLEY.

ALGERIA. (1937). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1936. **[Report of the Institut Pasteur for 1936].** [SERGENT, Ed.]—*Arch. Inst. Pasteur Algér.* **15.** 277-313. 2 tables. [Numerous refs.]

This report reviews a large amount of research and routine work performed during the year. The work on research and other investigations embodied in 64 publications made during 1936 is recapitulated under the separate sections. Those of veterinary interest include leishmaniasis, mycoses, pathology, piroplasmoses, animal rickettsiasis, rabies, swine fever, sheep pox, venins and antivenins.

A total of 48,065 laboratory examinations performed included 1,979 for veterinary services. 912 litres of antisera and 4,829 litres of various vaccines were produced. 1,734,267 doses of sheep pox vaccine were issued. 88,970 c.c. of anti-rabies vaccine was prepared for the prophylactic vaccination of dogs and for treatment of herbivora after infection.—S. J. GILBERT.

TUNISIA. (1937). Rapport du Chef du Service de l'Elevage pour l'année 1936. **[Report of the Livestock Service for 1936].**—*Bull. Off. internat. Epiz.* **15.** 33-38.

The veterinary staff provided is proving insufficient to meet the needs of the country, the number having been reduced to eleven. A drought was experienced in 1936 and foodstuffs had to be sent to severely affected districts.

FIELD WORK.—Existing contagious diseases include tuberculosis, anthrax, blackleg, rabies, foot and mouth disease, sheep pox and mange. An outbreak of CONTAGIOUS MASTITIS of sheep and goats was successfully treated with two inoculations with an autogenous staphylococcus vaccine. CONTAGIOUS BOVINE ABORTION is spreading slowly and isolation and vaccination are practised. PIROPLASMOSIS occurred to about the usual extent. Premunition is recommended, but application for the vaccination of only 250 animals was received. CUTANEOUS LEISHMANIA INFECTION of dogs appears to be more common than was formerly supposed. Other diseases encountered were ENTEROTOXAEMIA of sheep, PARABOTULISM in horses, and a CONTAGIOUS CONJUNCTIVITIS of sheep. Preventive treatment for worm infestations was extensively applied. Poultry diseases included fowl pox, salmonella pullorum infection and fowl typhoid.

RESEARCH.—Vaccination against JOHNE'S DISEASE by the method of Vallée and Rinjard is giving promising results. In BOVINE BRUCELLOSIS various methods of diagnosis were examined and strains of brucella identified. Many kinds of drug treatment were applied, but without diminution of agglutinating titres or of the power of infected milk to infect g. pigs. Treatment by vitamin E has not given favourable results. Observations on premunization and drug treatment for PIROPLASMOSIS were continued during the year. 2,562 examinations were made in the laboratory, and 4,870 doses of vaccines were prepared.—S. J. GILBERT.

TUNISIA. (1937). Fonctionnement des services de l'Institut Pasteur pendant l'année 1936. **[Report of the Pasteur Institute for 1936]**.—*Arch. Inst. Pasteur Tunis.* **26.** 403-421. Numerous tables.

The work of this Institute is mostly concerned with laboratory activities for medical services. 185 examinations were made for veterinary services. 1,125 doses of BLACKLEG vaccine were prepared and also vaccine for FOWL CHOLERA and FOWL TYPHOID. 437 doses of anti-rabic vaccine were prepared for veterinary use. The results of research work have been separately published in various scientific journals.—S. J. GILBERT.

ZANZIBAR PROTECTORATE. (1937). **[Report on] Veterinary [Work for 1936]**.—*Rep. Dep. Agric. Zanzibar, 1936.* pp. 5-6. 1 table.

There was no serious outbreak of disease except among poultry. The carelessness of owners, and the unhygienic conditions under which fowls are kept, assisted in the rapid spread of FOWL CHOLERA.—F. J. ANDREWS.

INDOCHINA, SAIGON. (1936). Institut Pasteur de Saigon. **[Report of the Pasteur Institute at Saigon for 1935]**.—*Arch. Inst. Pasteur Indochine.* 6. 411-417.

This report describes various laboratory activities, chiefly of medical interest, and includes laboratory examinations, preparation of vaccines and antisera, and various other services. Investigations of outbreaks of animal disease were also carried out and 618 laboratory examinations were made for veterinary services. The virus of SWINE FEVER was identified on five occasions and a study of pig diseases was undertaken. Fifty-five P.M. examinations of dogs suspected of RABIES were performed. 5,800 doses of fowl cholera vaccine were issued.—S. J. G.

INDOCHINA. (1936). Etat du cheptel indochinois. Cochinchine. **[Veterinary Report for Cochin China, April-June, 1936]**.—*Bull. écon. Indochine.* **39.** 467-473. 3 tables.

134 outbreaks of RINDERPEST and 27 outbreaks of HAEMORRHAGIC SEPTICAEMIA occurred. 35,292 animals were dealt with in connexion with the former

and 8,735 in outbreaks of the latter. There was an average mortality of 11 per outbreak and five per outbreak respectively. Details of the outbreaks in four districts are given. Seven cases of RABIES were confirmed. 422 laboratory examinations were made.—S. J. GILBERT.

BOOK REVIEWS.

WUNDRAM, G. [Dr. Oberregierungs-und-veterinärrat im Polizeipräsidium, Berlin], & SCHÖNBERG, F. [Prof. Dr. Direktor des Instituts für tierärztliche Lebensmittelkunde der Tierärztlichen Hochschule in Hannover]. (1937). Tierärztliche Lebensmittelüberwachung. [**Veterinary Food Inspection**]. pp. 327. 137 figs. [Numerous refs.] Berlin: Richard Schoetz. [2nd Edit.] [8vo] [RM.13.60].

This extremely instructive little book covers the whole field of meat inspection, including the examination of poultry, fish, wild game and prepared foods such as sausages. A useful bibliography follows each chapter. The book is, of course, written entirely from the standpoint of German public health regulations and butchery methods and to that extent will only be of comparative interest to readers outside that country. The section dealing with fish, crustaceans and molluscs includes, in addition to the pathological conditions to be sought, a valuable indication of the best methods of distinguishing commonly marketed species. The chapter dealing with poultry and wild game contains useful hints regarding aging and the anatomical differentiation of species which may be confused when "dressed" (*e.g.* hares and cats). An instructive section upon the marketing of eggs and their examination over an alluminant (candling) for faults serves to complete this very comprehensive little handbook. The bacteriological aspect of food examination does not receive consideration.—E. J. PULLINGER.

VON OSTERTAG, R. (1937). Leitfaden für Fleischbeschauer. Eine Anweisung für die Ausbildung als Fleischbeschauer und für die amtlichen Prüfungen. [**Introductory Course for Meat Inspectors**]. pp. xii + 375. 199 figs., numerous tables. Berlin: Richard Schoetz. [21st Edit.] [8vo] [RM. 9.80].

In 1937 the old meat inspection regulations for Germany were revised and enacted under a new Meat Inspection Law; this fact has necessitated the publication of this new edition, which is a complete guide to meat inspection as now carried out in Germany. It has, of course, no direct and detailed interest outside that country, but is of comparative interest to meat inspectors elsewhere and is very valuable for reference purposes. It does not deal with the general science of meat inspection *per se*, which subject has been dealt with in another book by the same author [*V. B.* **4.** 636].—J. E.

WILKIE, J. [B.Sc., Department of Biology, Guy's Hospital Medical School]. (1937). **The Dissection and Study of the Sheep's Brain.** pp. xv + 95. 53 figs., 2 plates. London: Humphrey Milford, Oxford University Press. [8vo] [6s. 0d.]

Owing to the complexity of the structure of the human brain, which has undergone special changes of an evolutionary nature, it is convenient to study the brain of a less complex type, such as that of a sheep, and to dissect the brain of this animal simultaneously with a human brain.

As a guide to such comparative study the author has written a systematic description of the dissection of the sheep's brain. In conformity with its object,

the work stresses points of comparative interest in relation to the human brain, but as a dissection guide the book contains much of interest to the veterinary student and post-graduate worker. The book includes numerous line drawings, among which is a series depicting cross-sections at different levels. These are useful in correlating the knowledge of brain structure acquired by direct dissection.

—G. B. BROOK.

MARKOWITZ, J. [M.B. (Tor.), Ph.D., M.S. in Exp. Surg. (Minn.) Research Associate, Department of Physiology, University of Toronto; Formerly Prof. of Physiology, Georgetown University School of Medicine, Washington, D.C.; Formerly Assistant in Division of Experimental Surgery and Pathology, Mayo Foundation, Rochester, Minn.] (1937). **Textbook of Experimental Surgery.** pp. xv + 527. 330 figs. [Numerous refs.] London: Baillière, Tindall & Cox. [8vo] [31s. 6d.]

Surgical dexterity and skill demands practice and repetition in a variety of circumstances. In this connexion experimental operations on the dog are invaluable to the worker specializing in human surgery. The book is a guide to this work and deals with a series of surgical exercises in the form of operations on the alimentary canal, gall-bladder, pancreas, liver, heart, blood vessels and the skeletal and nervous systems of the dog. The detailed descriptions and numerous illustrations render the text of great interest to the veterinary clinician. Many of the procedures such as methods of suture, laparotomy, thoracotomy, bowel anastomosis, nephrectomy and bone-plating, together with the auto-inhalation and intra-tracheal insufflation methods of anaesthesia, have a direct application in veterinary work. Details of a narcotic which can be given subcutaneously to the cat will be welcomed by the practitioner.

Besides being an exercise in technique, the operations have been planned to illustrate and emphasize the relevant surgical physiology and pathology which are discussed in the light of recent knowledge.

The book is indispensable to those engaged in clinical teaching and research. Not only does it set a standard for future publications on animal surgery, but it indicates the technical skill which can be achieved through specialized study.

—G. B. BROOK.

ANON. (1937). **Culture Methods for Invertebrate Animals.** pp. xxxii + 590. Numerous figs. and tables. [Numerous refs.] Ithaca, New York: Comstock Publishing Co. Inc. [8vo] [$4.00].

This book has been prepared by a number of American zoologists working under the direction of a committee of the American Association for the Advancement of Science. A wide territory has been explored to discover material for this truly valuable work of reference. Every scientific worker is familiar with the all too frequent obstacles which confront him in the search for a suitable technique. In the present work there are useful descriptions of tested technical methods, which are systematically arranged under each group from the protozoa to the ascidians. From the veterinary standpoint the principal value of the book probably lies in its references to parasites and the culture methods for protozoa and nematode worms. Each section is followed by a list of useful papers to which the reader is referred for more detailed information. The book deserves nothing but praise.

—C. HORTON-SMITH.